

OCTOBER 1996

# Macworld

THE ESSENTIAL MACINTOSH RESOURCE

## The Information Rush

**Everything  
you need to succeed  
in print and on  
the Web**

### IN THIS ISSUE

Top Internet **Publishing** Tools

How to Keep Your **Web Site** Hot

**Print** Publishing's Next Steps

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**Internet Explorer for the Macintosh.**

Unlock the power of the Internet with this awesome browser. Small, fast, and designed for the Mac, Internet Explorer supports a rich multimedia experience and is easy to set up and use. The excitement of the World Wide Web awaits you.

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Set up shop on the Internet or just publish a personal web page with tools you already know how to use. These additions to Microsoft Excel 5.0 and Word 6.0 easily turn your documents into HTML with just a few clicks.

## Everything to gain.

**Word 6.0.1a Update**

If you are still running Word 6.0 you will definitely want to upgrade your software to this much improved version. Word 6.0.1a, introduced last fall, enhances performance and stability, speeds up your boot time and word counts, improves font handling and much, much more.

**System 7.5 Update 2.0 from Apple Computer.**

Now you can get the most from your Mac with Apple's free update for System 7.5 users. This update will improve overall stability and performance and, if you use Virtual Memory on your PowerMac,<sup>™</sup> start your applications up to four times faster than before.



Now you can download Microsoft's Internet Tools and discover the new Internet capabilities of your Mac. Free.\* Microsoft's continued commitment to the Mac means you'll be browsing, creating, and accomplishing more than ever before. To obtain your Internet Tools, and

**Nothing  
to lose.  
{THEY'RE ALL FREE.}**

the System 7.5 Update 2.0, please visit [//www.microsoft.com/macoffice/](http://www.microsoft.com/macoffice/). Or to order a free Microsoft Empowerment Pack for the Mac, which includes a CD-ROM with the software listed above plus a special offer on RAM from Kingston, Technology call 800-469-6520 Dept. MCA.

**Microsoft®**

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\*Connect time charges may apply.

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**WE'RE FIGHTING BACK FOR MAC!**

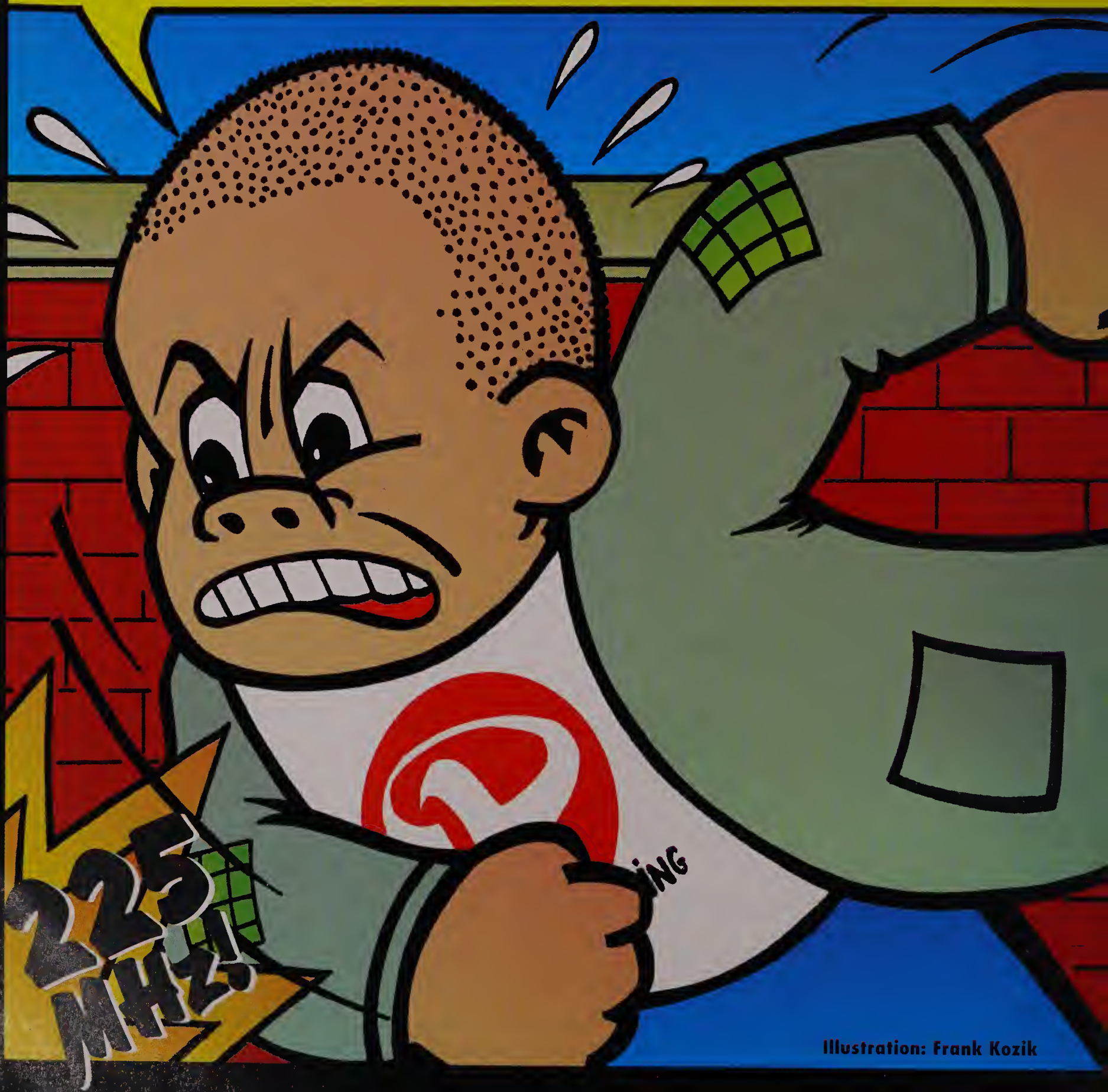


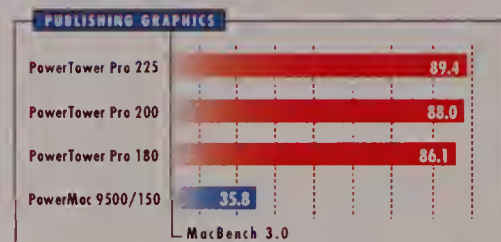
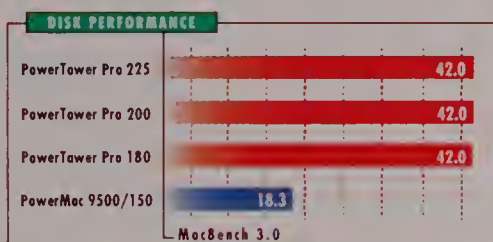
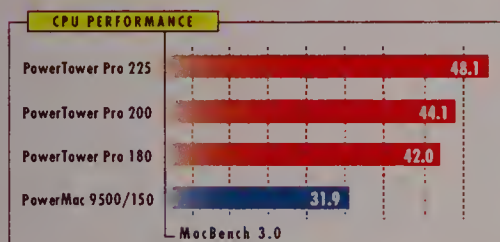
Illustration: Frank Kozik



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## THE POWERTOWER™ PRO 225 MHz. SIX PCI SLOTS. INTERLEAVED MEMORY. DUAL FAST SCSI. 8X CD-ROM



**"THE POWERTOWER PRO SERIES SOARS ABOVE ALL MAC RIVALS....MAC POWERUSERS WILL SOON BECOME POWER COMPUTING USERS IN DROVES"— MACWEEK MAGAZINE 7.22.96**

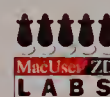
### We're fighting to put the MacOS on top!

We love the Mac, just like you. In fact, most of us here at Power Computing have spent our lives working for and with Apple Computer - engineering the Macintosh systems you've

**"HANG ON TO YOUR HAT...POWER COMPUTING WIDENS THE GAP. THE NEW POWERTOWER PRO BOASTS FIRST POWERPC 604e AT UP TO 225MHz"**  
— MACWORLD MAGAZINE SEPT '96

worked and lived with since 1984. Power Computing's goal is simple: provide the Mac market with more choice, power and performance. Take our PowerTower Pro series featuring the new PowerPC 604e RISC processor. It's not

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# Macworld

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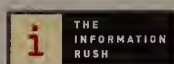
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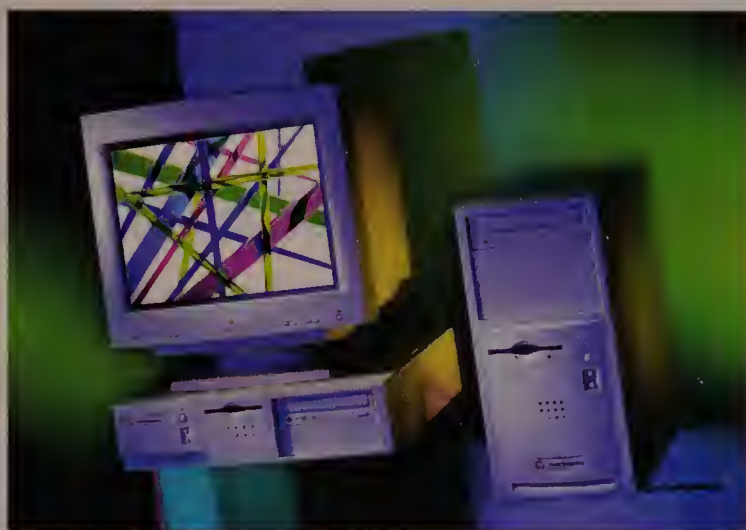
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**"POWER COMPUTING'S NEW POWERTOWER PRO REDEFINES SPEED...POWER WIDENS THE GAP."**

— MACWORLD MAGAZINE, SEPT, 1996

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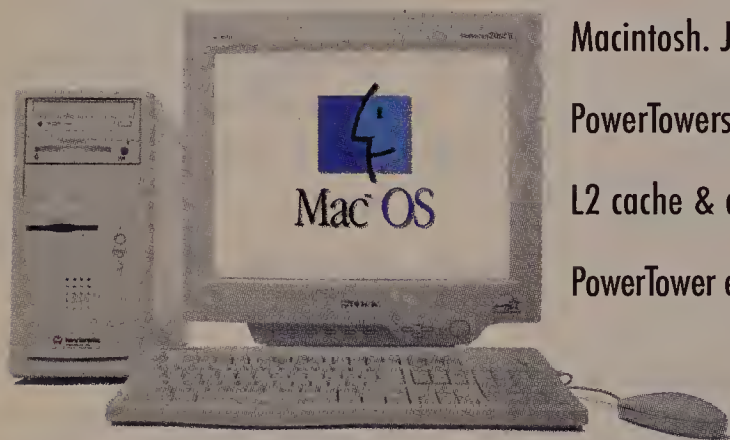
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— MACWEEK MAGAZINE



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- 8X CD-ROM Drive
- 1 MB Level 2 Cache
- IMS Twin Turbo 128M graphics accelerator with BMB VRAM
- 6 PCI Expansion Slots
- Interleaved Memory
- 9 Drive Bays
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- Extended Keyboard and Mouse
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#### 180MHz PowerPC 604e Processor

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- 2 GB 7200 RPM AV Hard Drive
- 8X CD-ROM Drive
- 1 MB Level 2 Cache
- IMS Twin Turbo 128M graphics accelerator with BMB VRAM
- 6 PCI Expansion Slots
- Interleaved Memory
- 9 Drive Bays
- Dual (Fast 10 MB/Sec) SCSI
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- Add Sony 17" Trinitron 17sfil \$875

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### PowerTower 200e Starter

#### 200MHz PowerPC 604e Processor

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- 2 GB 7200 RPM AV Copable Hard Drive
- 8x CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM On-Board (4 MB Max)
- 3 PCI Expansion Slots
- Connectix Speed Doubler
- Mini-Tower Enclosure
- Extended Keyboard and Mouse
- Add Sony 17" Trinitron 17sfil \$875
- Add Iomega Jaz 1 GB Drive \$395 More

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### PowerTower 180e Starter

#### 180MHz PowerPC 604e Processor

- 16 MB RAM (512 MB Max)
- 2 GB 7200 RPM AV Copable Hard Drive
- 8x CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM On-Board (4 MB Max)
- 3 PCI Expansion Slots
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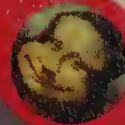
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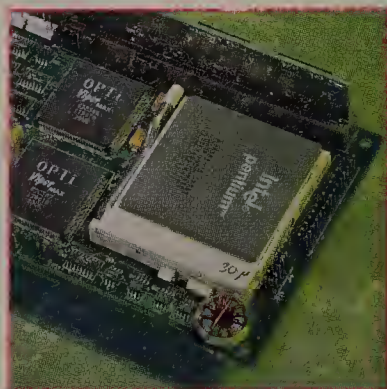
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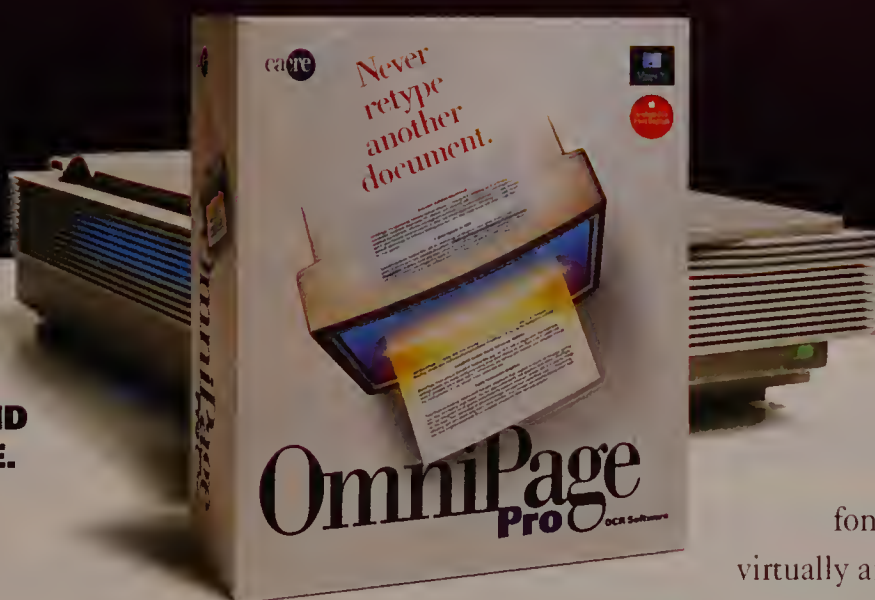
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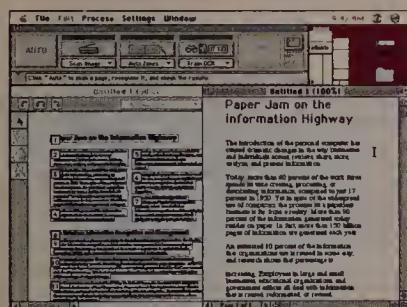
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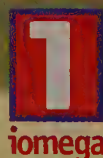


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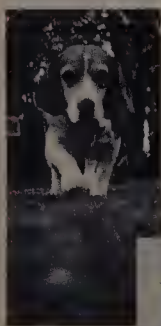
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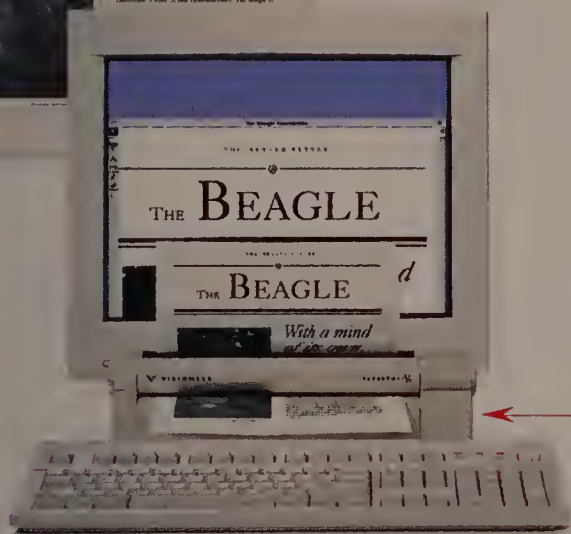
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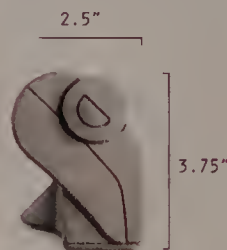
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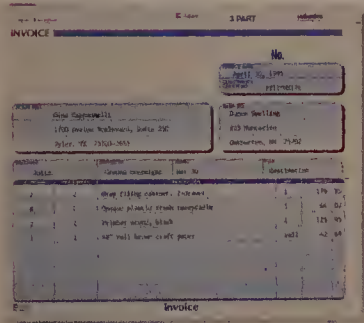
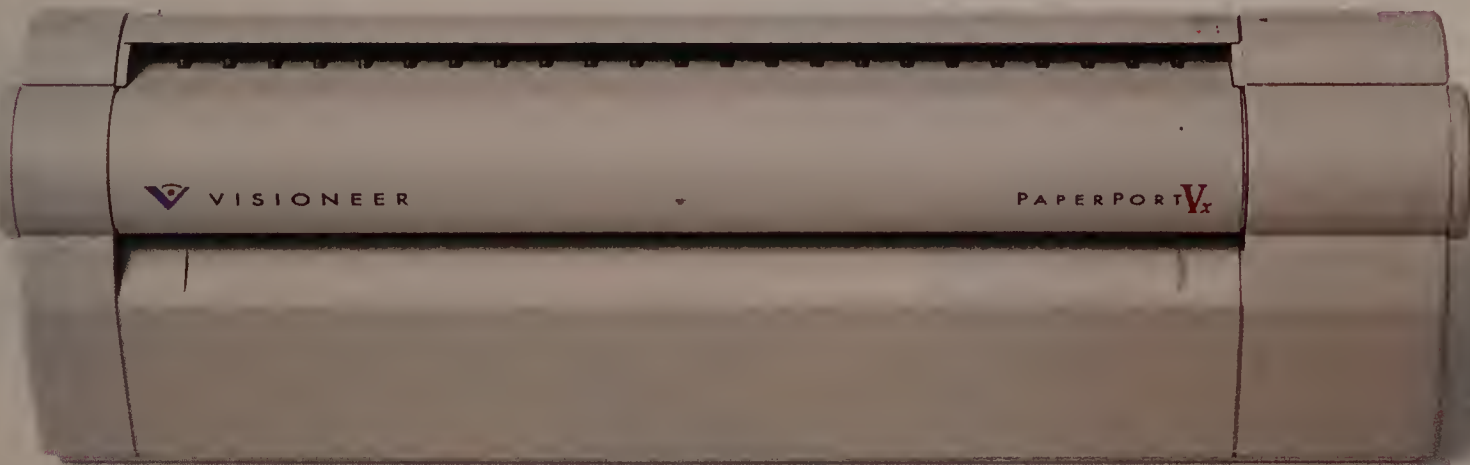
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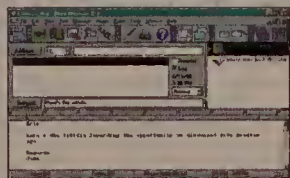
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**BUGS AND TURKEYS** Send us descriptions of turkeys (flaws in conception or design) and bugs (defects or flaws in execution) with your telephone number, mailing address, and T-shirt size.

**STREETWISE SHOPPER** Vendors and resellers, fax requests to obtain an application for inclusion of special product promotions in Streetwise Shopper.

**WRITING FOR MACWORLD** If you're interested in writing for us, send a self-addressed, stamped envelope with a request for our writer's guidelines. Do not send unsolicited manuscripts.

**FOUNDER** David Bunnell  
**FOUNDING EDITOR** Andrew Fluegelman 1943-1985

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For years, creative professionals have relied on award-winning UMAX scanners to capture the high quality images they demand as an essential part of their creative solutions. Now, UMAX has come full circle by offering them the ultimate computers on which to realize their vision...



## Introducing the SuperMac S900

Designed from the ground up specifically to meet the needs of the design professional. We've kept all the best things you like — the familiarity and ease-of-use of Mac OS and compatibility with all your favorite software — wrapped it all up with the raw power of a 604 150MHz PCI-based design and delivered it at a price that can't be beat. Many unique features of the new S900 have been designed to specifically eliminate performance bottlenecks that have long troubled the market.



### 1 Interleaved Memory

Every S900 comes standard with 16MB of interleaved memory on the motherboard for fast memory access and best system performance. Others require the purchase of additional DIMMs to implement memory interleaved.

### 2 Advanced Scalable Processor Design

UMAX's exclusive A.S.P.D. provides easy upgradeability to dual processors or for higher speed processors as they become available. This modular configuration costs less and is more flexible, allowing programs such as Photoshop to increase its performance up to 80% with the addition of a second processor card.



### 3 Exclusive PCI-to-PCI Bridge

Not only does the S900 have an amazing 6 PCI slots, it is also the first to enable burst communication between them.

The S900 is the first computer to enable direct communication between ALL PCI slots



UMAX's exclusive PCI-to-PCI Bridge design enables direct communication between all PCI cards with the greatest performance, no matter which slots they're inserted in, also making it more expandable and easier to configure.

### 4 E100 I/O & Networking Card

To increase performance even further, UMAX offers the ultimate combination upgrade that gives you both Ultra-Wide SCSI and 100Base-T on one easy-to-install PCI card. The 100Base-T boosts data transfer over networks up to ten times the speed of standard 10Base-T connections. Ultra-Wide SCSI provides 16-bit wide data access at rates up to 40MB/sec. (4 times the speed of regular SCSI)



MODEL		Processor Type	CPU Speed	Hard Drive Capacity	PCI Slots	Onboard RAM	Level2 Cache	CD ROM Drive	Graphics Card	Drive Bays	PRICE
▶ SuperMac S900L	Tower	604	150 MHz	2 Gbyte	6	16 MB	512 K	8x Speed	4MB VRAM	5	\$ 4395

\* Suggested Retail Price

UPGRADE OPTIONS	PRICE*
SuperMac E100 Extended Performance Ultra-Wide SCSI / 100Base-T	\$ 495
SuperMac P150 604-150 ASPD Processor Upgrade	\$ 995

\* Suggested Retail Price

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you, Now Startup Manager has been completely re-written and re-designed to keep your Mac going without any problems. It's just one of the many enhancements we've stuffed into Now Utilities™ 6.5.

We've also enhanced Now Super Boomerang™ to make it easier for you to

*Once you start using this package, you'll wonder how you ever got along without it.*

—Mac Home Journal,  
August 1996

work with files—just resize the Open and Save dialogs to see longer file lists and sort files in the order that's most useful to you.

When using Now

ShortCuts™, you can duplicate, compress, archive, lock and share your files with one mouse click. And NowTabs™, the component which gives you a quick-access tab bar at the bottom of your screen, also gives you a direct link to our 24-hour help desk for Now Utilities tips and solutions.



Now Utilities 6.5 continues to improve your Mac with other enhancements to Now FolderMenus™, Now AutoType™, Now QuickFile™, and Now Scrapbook™.

And of course, these time-saving functions all begin with the new Now Startup Manager. It offers superior automatic conflict resolution, as well as a complete online and downloadable extensions and conflicts database for up-to-the-minute

information. It manages third-party plugins from Netscape, Adobe, and others and even imports your old Conflict Catcher sets automatically for an easy switch. Not only is Now Startup Manager 7.0 included in Now Utilities 6.5, but it's available as a stand-alone product as well.

Visit <http://www.nowutilities.com> and try Now Utilities 6.5 and Now Startup Manager 7.0 for yourself. Before long, everyone will be talking about them.

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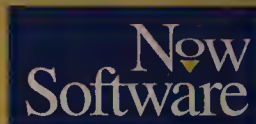
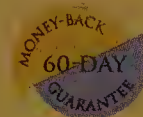
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Circle 56 on reader service card



# Letters

## Guided System Tours

I ENJOYED READING JOSEPH SCHORR'S "quick cures for chronic System bloat" (*Secrets*, July 1996). But I must take exception to the advice on removing the Apple Guide extension from your System Folder. More and more applications are shipping with Apple Guides, and they are well worth checking out. Even an experienced user needs a quick refresher occasionally.

After installing System 7.5 Update 2.0, I couldn't hear any music when I used AppleCD Audio Player. I fiddled with the Sound control panel with no luck. When I took a peek at the Apple Guide, it took me straight back to the obscure Options button I had overlooked in my first trip to the Sound control panel. I fixed my problem in two minutes.

Dump some of the Apple Guides from your System Folder if you wish, but keep the Apple Guide extension. It is sure to come in handy.

KARYN VOLDSTAD  
Rochester, New York

## Honk if You Love Apple

THREE CHEERS FOR DAVID POGUE'S snappy answers to all that anti-Mac hysteria (*The Desktop Critic*, July 1996). However, if I'm going to clip Mr. Pogue's article, the last place it needs to be is on my own refrigerator. Preaching to the choir is what got Apple in trouble in the first place.

We should be shouting our counterpoints from the highest rooftop, as should Dr. Amelio and his "humbler, smarter" Apple Computer.

ARIEL VITALI  
Farmington, Connecticut



I WELCOMED POGUE'S ENCOURAGING comments regarding the future of the Mac, but he's off base when he compares automobile manufacturers to computer companies. Unlike computer users, many dwellers on this planet purchase automobiles for their snob appeal. An expensive automobile may be shown off and is regarded as an indicator of the owner's status in our society. When was the last time you heard of a Sun workstation being installed in a private home to impress the neighbors?

PHILIP BAUMEISTER  
Sebastopol, California

THANK YOU! "CLIP-N'-SAVE APPLE: THE Numbers Nobody Knows" not only boosted my belief in Apple, but provided some much needed material with which to effectively silence the Mac-is-dead crowd. To paraphrase Mark Twain, reports of Apple's death are indeed great-

ly exaggerated. I'll be posting this article in the school staff room.

ROBERT PELLETIER  
Toronto, Ontario, Canada

AS A NEW APPLE SOFTWARE DEVELOPER, I have to constantly defend my platform to PC users. I'm glad somebody's finally given me some ammunition.

PHILLIP GILLIS  
Natchitoches, Louisiana

MANY THANKS AND MUCH APPRECIATION to David Pogue. I'm in the military, which means nothing but PCs at work and die-hard users with their own DOS boxes at home. I photocopied the column and gave it to my PC-biased friend. For days he put off reading it and continued to make ridiculous statements about Apple's demise, even showing me an early February issue of a popular news-magazine claiming that Apple was now owned by Sun Microsystems (I guess he didn't notice the generous use of words like *alleged*, *perhaps*, and *maybe* throughout the article). I was sitting at my desk when he tossed the copy of David Pogue's article on my keyboard and simply said, "I stand corrected."

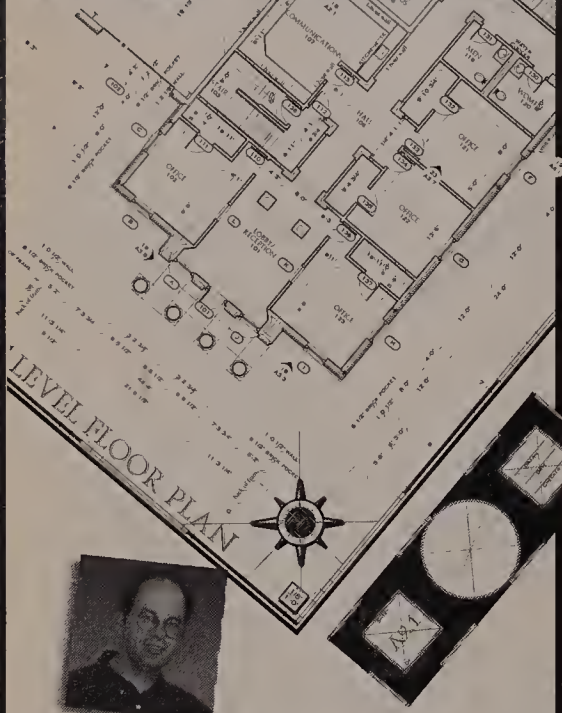
JOSEPH L. PUENTE  
Winter Harbor, Maine

## Valued Dusty Tomes

A COUPLE OF DAYS AGO WHILE CLEANING my room I found a box with all of the manuals, brochures, and magazines for my Atari 800XL. Sure brought back great memories, and it reminded me how far computers have advanced since my first program hack in glorious Atari BASIC. I still have the computer and its *continues*



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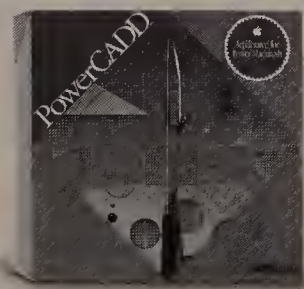


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## LETTERS

### CORRECTIONS

- The maker of the Internet remote pictured in the August 1996 Table of Contents is Diba.
- The bug in StuffIt 4.0 (Consumer Advocate, September 1996) exists in machines running System 7.5.3.
- The correct telephone number for Astarte is 612/483-5338 ("Desktop CD Recorders," September 1996).
- BBEdit's list price is \$119; BBEdit Lite is available online as freeware (Reviews, June 1996).
- The circuitry on the Motorola and IBM 604e and 603e PowerPC chips will be 0.35 microns wide ("The PowerPC's New Heights," News, July 1996).
- The correct bus speed for the Power Computing PowerTower is 60MHz. The correct price for the Editors' Choice Business User's System from Power Computing is \$3678 ("The New Speed Champs," July 1996).
- The capacity of Microtech's Blue Storm 2000, with the Conner CFP 2107S mechanism, is 2.1GB ("Gigabyte Hard Drives," June 1996).
- The correct telephone number for Insider Software is 619/622-9900 ("Tame Those Unruly Fonts," News, July 1996).

component pieces stored safely away so I can show it to my children one day.

As I sat mulling over the catalogs, manuals, and magazines, I found the brochure (mint condition) from 1984 for the original Macintosh computer. I'm glad I kept that brochure; it's a historical little advertisement. It heralded the end of home computing as I knew it. I feel very comfortable with Apple's immediate future, but in 12 years, when I pull my Power Mac out of the attic and blow away the dust, I wonder how and with what I'll send someone else a message about what a great time it was using my Mac.

ANDREW S. DUNCAN  
Atlanta, Georgia

### You Can Look It Up

I'M FINDING IT MORE AND MORE DIFFICULT to keep up with all the acronyms used to express technology, products, and conventions of the computer industry. It

would be nice to have a ready reference list containing these cryptic expressions and a brief explanation of each. Can you recommend a source listing such information with periodic updates?

RANDY VANIA  
Griffith, Indiana

My favorite computer reference is Alan Freedman's *The Computer Glossary: The Complete Illustrated Desk Reference*, seventh edition (\$24.95, \$39.95 with disk; 1994, AMACOM, 518/891-1500). You could also do a Web search on computer reference: I came up with some interesting-looking sites like *A Beginner's Web Glossary* (<http://www.cwru.edu/help/webglossary.html>), *Babel* ([www.access.digex.net/~ikind/babel96b.html](http://www.access.digex.net/~ikind/babel96b.html)), the *ILC Glossary* (<http://www.matisse.net/files/glossary.html>), and *Eric Tittle's Reference Sites* (<http://phobos.astro.uwo.ca/~etittley/references.html>), as well as a listing of Japanese restaurants, the *Orange County Online* page, and *Eric Mathiasen's résumé*.

I'll stick with the book.—Ed.

### Herding Bulls and Bears

IT'S BECOMING CLEAR THAT IT'S A desert out there in terms of Mac software for investors and stock tracking. Can you shed any light on my search, which has to date been unfruitful?

GARRY GALLAGHER  
Vancouver, British Columbia, Canada

*Trendsetter Software* (714/547-5005; <http://members.aol.com/trndsetter/www>), *Dow Jones & Co.* (800/522-3567), *Survivor Software* (310/410-9527), and *Reality Technologies* (215/387-6055) all have investor- and stock-related software packages for the Mac.—Ed.

### Macworld: We're Everywhere

RECENTLY, I POSTED A MESSAGE TO the *comp.sys.mac.portables* newsgroup inquiring about what modem to get for my PowerBook.

Imagine my surprise when among the messages I received I found one from *Macworld* contributor Gene Steinberg, offering advice based on his own experience. His concise and informative input on the matter greatly clarified things for me, especially given the complexities of buying a PowerBook 5300 nowadays.

continues



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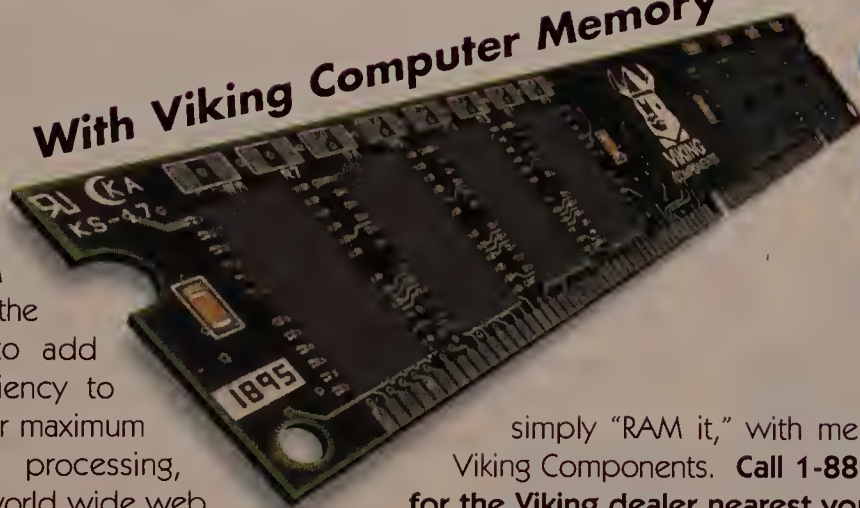


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## LETTERS

It's a refreshing thing to know that *Macworld* doesn't exist in an ivory tower, and that your reviewers live in the real world and contribute to the global Macintosh community. Gene and the other helpful folks in the online world definitely deserve a pat on the back.

TAN WU MENG  
Singapore

### Did We Say That?

SOMEONE TELL TIM WARNER THAT A micron is a millionth of a meter, not a millionth of an inch ("The PowerPC's New Heights," *News*, July 1996).

ROBERT LEVITZ  
Hartford, Connecticut

### More Details, Please

I REALLY ENJOYED JULY'S *PUBLISHING Workshop*, "Faster Printing through Font Downloading." I have been trying to figure out how to attach a hard drive to a printer and what types of fonts to download onto the drive. Would you describe those details in more depth?

GARY BERNSTEIN  
Urbana, Illinois

*The procedure is really quite simple. You just attach a hard drive to the printer via a normal SCSI connection and then, using Apple LaserWriter Utility, Apple Printer Utility, or Adobe Downloader, format the drive. (Note that this process is distinct from the formatting you'd perform on your Mac's internal or external hard drive.) Finally, download fonts to the newly formatted drive, using the same utility.—Ed.*

### PopupFolder Moves Again

I JUST CAME ACROSS THE LETTER NOTING that PopupFolder is no longer being published by Inline Software ("Ever-Growing Utility Belt," *Letters*, July 1996). I am pleased to inform you that ASD Software has now acquired the rights to publish this award-winning product. Interested readers can try it out by downloading a fully functional demo of PopupFolder from our Web site, <http://www.asdsoft.com>.

WES WASSON  
ASD SOFTWARE  
Montclair, California

### Attention, Macworld Shoppers

PROPOS OF YOUR ARTICLE "PC CARD Modems" in the July 1996 issue, we would like your readers to know about Zoom's popular V.34C PC Card fax modem. The Model 521 Zoom/PCM-CIA FaxModem V.34C-Mac is designed for both land-line and cellular data and fax communications on the Macintosh platform. It is Macintosh PowerBook Qualified, with a list price of \$269. In addition, a telephone-specific cellular activation kit is available direct from Zoom for \$59.

LEONARD A. PHILLIPS  
Zoom Telephonics  
Boston, Massachusetts

### "The Littlest Web Server"

REGARDING FRED KRUGHOFF'S Letter, "The Littlest Web Server" (*Letters*, July 1996): I don't know about anybody else out there, but I didn't know it was possible to run a server using standard phone lines and fast modems. I'd be very interested in finding out more about how this works—like, where do you start? Perhaps some kind soul (maybe Fred Krughoff himself) could E-mail me with a few more details, particularly about the very careful setup required.

PETER MILLARD  
London, England

*It is indeed possible, but the performance is so slow that few people consider it a viable option. If this is the route you choose, your best bet is to contact Internet service providers and compare costs for unlimited connect time, registering a domain name, and various other items associated with operating a site (costs can mount up). Alternatively, some people bring their servers directly to the ISP, which avoids connection complications and generally gives far better performance.—Ed. m*

Letters should be sent to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (keyword *Macworld*), AppleLink (*Macworld1*), or via the Internet ([letters@macworld.com](mailto:letters@macworld.com)). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.



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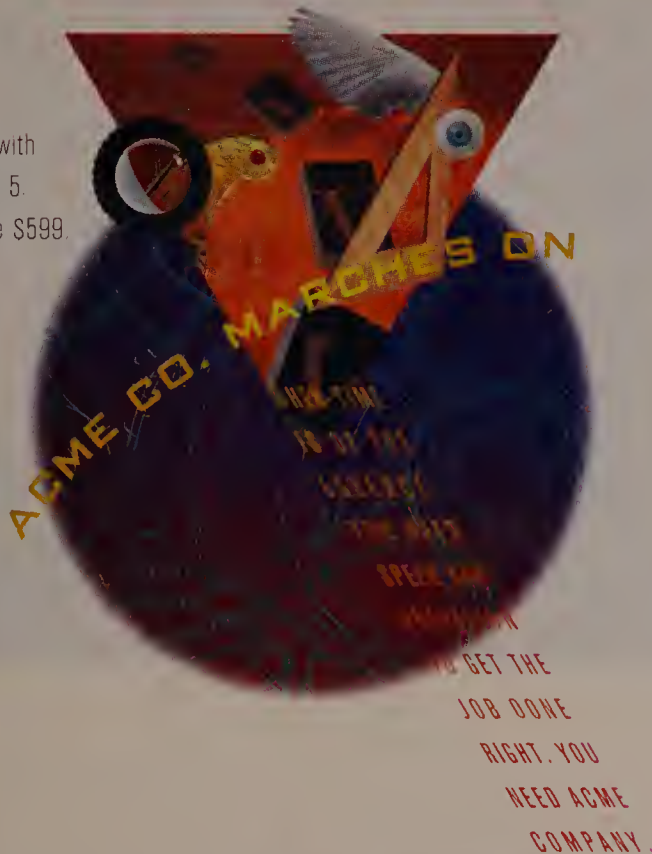
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Mark Hall  
Editor in Chief  
Macweek  
July 24, 1995

"Canvas 5, what a product! Image editing, page layout, presentation and tech illustration wrapped into one easy to use interface. This is the true Swiss Army Knife of any graphics applications out there. Deneba has done everything the graphics community has asked for."

Keith Boncek  
Director of Computing  
Cornell University  
August, 1995

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If you own a graphics program, trade up to Canvas 5 for just \$149.95 (so little to spend, so much to gain). See your favorite reseller, or order securely online by surfing to <http://www.deneba.com/orders/>. For a Canvas dealer near you or to order by phone, call 1-800-622-6827 or dial (305) 596-5644 (outside the United States).

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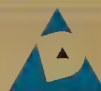
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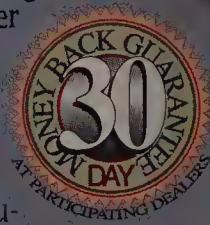
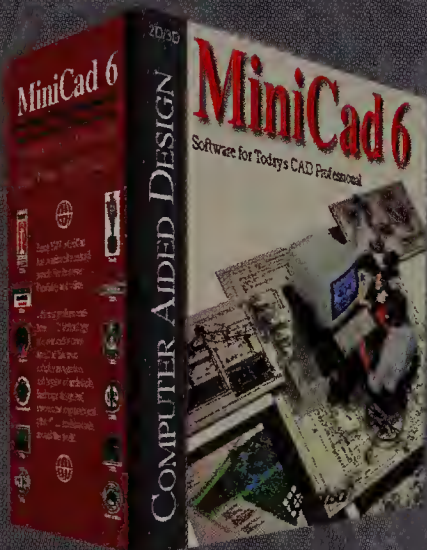
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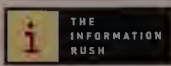
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# State of the Mac

by Adrian Mello



## Get Ready for the Information Rush

EMERGENCY RELIEF FOR PRODUCERS AND CONSUMERS

SEVERAL YEARS AGO IT WAS common to hear media commentators and private citizens alike bemoaning the condition known as *information overload*. Computers were enabling people to produce and distribute information at an unprecedented rate, issuing reams that no one could possibly assimilate. And that was before the World Wide Web. Now we swim in oceans of digitally produced data, with new oceans being created weekly, all in a perpetual process of metamorphosis. Compared with the plethora of outposts that are popping up in cyberspace, the original harbingers of information overload—desktop publishing, broadcast, E-mail, and so on—now seem positively innocuous.

Now, before you accuse me of a lack of journalistic perspective, let me assure you that yes, I do recognize that this condition does not affect all of humankind—not yet. But as members of the computer-using community, we've all become familiar with feeling simultaneously fascinated and overwhelmed by the onslaught of *content*. It's bad enough for information consumers, who must struggle to figure out how to parcel out their valuable time to the multitude of media sources vying for their attention. Information producers must in addition constantly stay abreast of the technological changes that affect *how* they compete for that treasured resource—an audience.

Whether you identify principally with the producers or the consumers of information, this special issue of *Macworld* provides a guide to some of the tools and tactics you'll need to make wise decisions as you run headlong into the waves.

### An Embarrassment of Riches

If you're an information producer, you now have more ways than ever before to make your message heard. You can choose

among brochures, magazines, catalogs, E-mail, television, radio, CD-ROMs, Web sites, and netcasts, to name just some of the options. That's the good news. The explosion of media types and venues for deploying them ups the ante, creating an even faster-paced, more demanding, more competitive environment. That's the challenge. Information producers must somehow get today's message out and simultaneously acquire and master newly emerging technologies.

In this issue we investigate a broad array of content-creation tools, from multimedia authoring software to drum scanners. In *Reviews* alone we evaluate 13 new products that exemplify the diverse choices available for creating and managing

Wide Web—are attracting the limelight at the moment, desktop publishing and color prepress quietly continue to occupy a huge portion of the professional Mac market. In this more mature market segment, tasks that used to be relegated to consultants and contractors with specialized expertise have begun to move in-house, particularly where ongoing projects require regular updating. In "Should You Fire Your Service Bureau?" *Macworld* helps you evaluate whether it's time for you to bring your prepress work into your office. It's not a decision to take lightly.

### Mixed Media

Choosing any one medium and becoming proficient in it is tough enough.

Today, information producers work increasingly in multiple media, which requires not only that they acquire professional-level skills in several types but also that they learn how to integrate converging media. For example, you may need to create a booklet to market a family of products and then redeploy much of its content to the company Web site. Your vice president of sales might also ask you to use the same visuals and text in a multimedia presentation that can run off of a PowerBook. Repurposing is the order of the day.

The power and versatility of digital media make this a fascinating field in which to work. In the midst of repurposing and recasting content in different forms, however, it is easy to overlook one of the great hazards of using these powerful creative tools—the increased risk of copyright infringement. "Copyright and the Visual Arts," a special report in the *Media* section, provides a primer on what you need to know to

*continues*



ing content—XPress-to-HTML conversion utilities, Java development tools, 3-D graphics tools, a dye-sublimation printer, a database publishing utility for the Web, and so on. And to help you cope with the ever-increasing demand for fast, reliable, portable storage that all this creative activity produces, Macworld Lab evaluates the "Best Buys in Optical Drives."

While the new kids on the block—interactive multimedia and the World



avoid infringing copyright when working with digital media.

### The Blurring of Boundaries

Time was when the lines between information producers and information consumers were pretty tidy: you were either creative artist or audience, writer or reader, publisher or subscriber. Now that almost anyone can become an information producer simply by setting up a home page and posting it on a server, the lines

are not so clear. And in the long run that's probably a healthy development.

The ability to publish on the Web, posting new material quickly and bypassing the complications of physical distribution, has radically redefined production cycles for information producers. This has many implications for production tools, but more fundamentally it raises the expectations of information consumers. Because the Web is a truly live medium, visitors to your pages expect them to look

alive. "Energize Your Web Site" offers top-notch techniques for maintaining your site's strong pulse.

Apple has announced that one of its primary objectives is to make it easy for any new Macintosh to work as a personal Web server, more or less out of the box. Realistically, not everyone will have a full-blown Web site with rich and varied content. There will continue to be big distinctions of scale among various classes of information producers, professional and amateur. But as "Web Authoring's New Tools" illustrates, the availability of Web authoring tools ranging from simple HTML page editors to complete site-management programs means the choice is yours to make.

### Macworld Expo, the Information Rush Incarnate

This issue goes to press on the eve of the annual Macworld Expo in Boston. At *Macworld* we prepare for these events like Marines getting ready to hit the beaches because they are one way for us to stay abreast of the information rush so we can bring the news fresh to you.

Even for seasoned campaigners, walking into a Macworld Expo can be an overpowering experience. There are so many products it's hard to know where to look. In two separate conference centers, companies line the aisles—phalanxes of vendors displaying the latest wares. Many vendors time their big product introductions especially for the shows, so there's a lot of clamor—one company competing to outperform the next with flashy multimedia demonstrations that visually and aurally assault the droves roaming the halls. Some booths are truly resplendent, with large platform structures of Plexiglas, metal, and wood containing internal meeting rooms. But experience teaches that sometimes the most exciting new products appear first in modest little booths tucked into inconspicuous corners of the show floor. Rest assured—wherever the story is, *Macworld* will ferret it out.

If you can't make it to the Expo, check *News* in this issue and on Macworld Daily online for late-breaking news of the show. And stay tuned: our news stories will help you know in advance what to look for in the coming months. For anyone interested in the Macintosh, *Macworld* is the antidote for the information rush. **m**

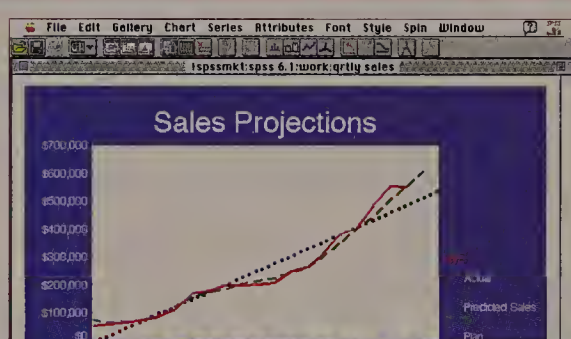
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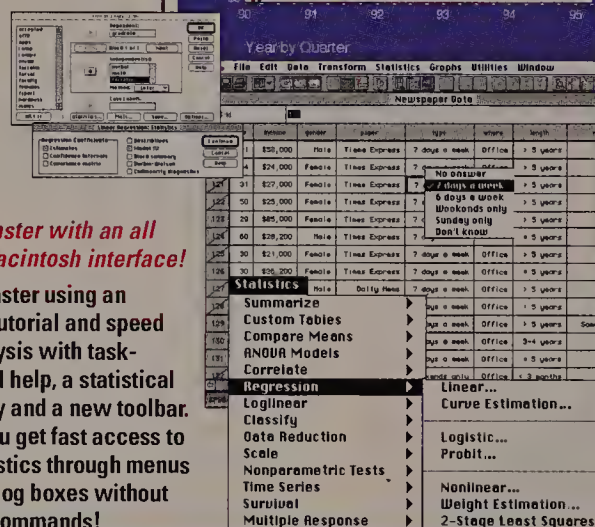
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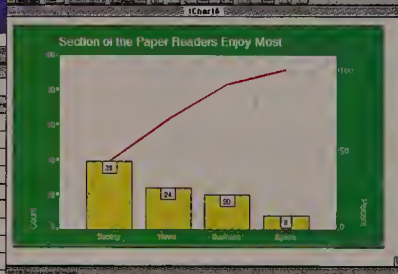
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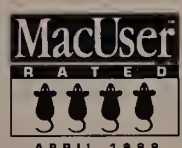


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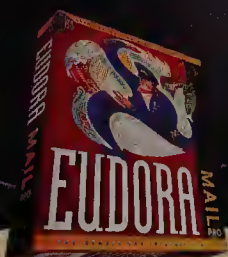


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# The Desktop Critic

by David Pogue

## Stuffing the Copland Suggestion Box

A MEMO TO THE WONDERFUL WIZARDS OF OS

**F**OR MONTHS, WE'VE BEEN reading about Copland, the next-generation operating system for the Mac (now known as Mac OS 8). According to an Apple programmer I know, even today the new OS's final look, feel, and feature lists are still up for discussion. In other words, there's still time to propose new features—which is exactly what I have in mind. Here are one man's ideas, duly stuffed into the Suggestion Box.

### Title-Bar Renaming

You're hard at work on some document. You decide to rename it. What do you do?

Sure: you use the Save As command, type a new name, return to the Finder, find the original document, throw it away. C'mon—life's too short!

I want to click in the title bar of my document window and type a new name. How clean! How easy!

### ⌘-Tab to Switch Programs

There are very few things Windows has that System 7.5 needs. One of them happens to be a keystroke to switch among several running programs. Instead of having to mouse up to the Application menu when we want to switch from, say, Quick- en to ClarisWorks, as we do today, imagine being able to press ⌘-tab.

To see exactly how terrific this feature is, get Program Switcher (shareware available at <http://www.macworld.com>). While your thumb sits on the ⌘ key, each time you press the tab key the name of the next open application appears in the middle of the screen. When the program you want is named, you release the keys—and you're there.

### Drag and Drop to the Apple Menu

Think how carefree life would be if you could install an alias of something in your Apple menu simply by dragging its icon

onto the menu's Apple logo. Of course, we'll need some equally convenient method of dragging things *off* the Apple menu, but I'll leave that up to Apple.

### Sticky Menus

We like the way our Mac menus work, snapping up unless you continuously grip them with the mouse button. But Windows fans are used to menus that drop down when clicked—and stay down until you click a choice. So let's please everyone: Apple should write a Menus control panel. It would let you specify how your menus should behave. If ever there were

it?" I sheepishly explain that you can't; you must (1) copy the file, then (2) delete the original.

Here's the brilliant idea: Let us hold down a key—the underused control key, say—while dragging an icon to a new disk; instead of copying, it would *move* the file and delete the copy on the original disk.

### More Drag and Drop

Few of System 7.5's offerings are more delightful than Macintosh drag and drop, the feature that lets you slide graphics, text, and sounds from one window into another. Drag text from a Stickies note into SimpleText. Drag a list of files you've found with the Find File command into ClarisWorks. And if you're *really* bored—drag a Desktop Pattern into your Jigsaw Puzzle for hours of mind-numbing fun.

But the drag-and-drop fairies didn't visit all of System 7.5's components during the night. You still can't drag numbers to or from the Calculator, nor a picture into the Map, nor a printer icon from the Chooser onto the desktop. Just about everything in life would be improved by D&D: after finding some elusive symbol in the Key Caps desk accessory, you should be able to drag it into your word processor.

And while drag-and-drop-enabling the rest of the desk accessories, Apple should spruce up the elderly Calculator in other ways, too. How about a CE (Clear Last Entry) button, or even a "paper tape" feature, so we wouldn't have to start over when we made a mistake?

### Solving the Big "Where Am I?"

Millions of new Macintosh users eventually get zapped by "out of memory" messages because they don't understand a sim-



a prescription for a mass exodus to the Mac from Windows, this has got to be it.

### Move to Trash Command

I want a keystroke, such as ⌘-T, to move a highlighted icon to the Trash. What a blessing to PowerBook users! What a gift to efficiency nuts! What a concept!

### Move a File without Copying It

I get at least one E-mail a week from a new Macintosh user asking: "When I drag a file from my hard drive to a backup disk, it copies the original file. How do I *move*

*continues*



ple fact: Closing all the windows doesn't mean you've actually quit a program.

When we close all the windows, we need a visual cue to let us know that we're still in a program. We shouldn't be left staring at the Finder desktop. Sure, sure, the power user knows to look in the Application menu to see which program has a check mark beside its name—but who on earth would figure that out instinctively? Maybe the new system software should put the name of

the current program somewhere on the title bar, or at the bottom of the screen.

### The Personal-Info Database

Enough with typing our names and addresses! Global Village, America Online, every other Web page, and dozens of other software products insist that we type in our names, addresses, and phone numbers when first using the software. What a colossal duplication of effort!

Here's the solution: OS 8 should

include a control panel that stores our personal-contact info. Once. Thereafter, Copland-savvy programs could retrieve all that info automatically (after we say OK, of course), saving us miles of typing.

### Auto-Deleting Aliases

The alias was one of Apple's greatest hits. But despite their overall high IQ—working even after the original file is renamed or moved, for example—aliases are still stupid in one regard. If you delete the original file, the orphaned alias hangs around, broken, meaningless, and sad. Fix this one, Apple, and you'll win thousands of converts on the spot.

### Macintosh Click and Type

This one will strike you as bizarre, but try to imagine it. Suppose you could click anywhere on the desktop and just start typing. When you're finished, you'd have a little clipping file, ready for dropping into a folder, dragging into a document, or just leaving out for later reading.

You could click and type while on the phone, for example, when somebody starts rattling off a phone number. You could make notes to yourself while downloading a file in the background. You could keep to-do lists, phone numbers, and book ideas right on the desktop! And beginners would love it—no more (1) launch program, (2) type, (3) save, and (4) hope to remember where you saved.

### The Upshot

Copland was named after Aaron Copland, the American orchestral composer whose most famous music suggested the majesty of the American landscape. (This may come as news to the people who send E-mail to me spelling it Copeland, CopLand, and Copplund.)

It's exciting that Apple names its core software projects after American composers. Clearly, Apple understands the similarities between software and music. Both are created by few but enjoyed by the masses, demand inspiration and perspiration, and require hundreds of tiny good ideas to make a masterpiece. Here's to 1997, when we'll find out what kind of tune Apple's been humming to itself. **m**

DAVID POGUE, a former Broadway conductor and software-design consultant, wrote *Macs for Dummies*, currently in its fourth edition (IDG Books Worldwide, 1996), the best-selling Mac book for five years straight.



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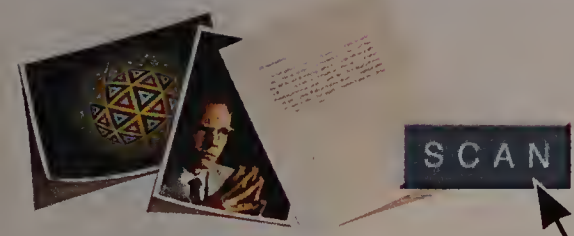
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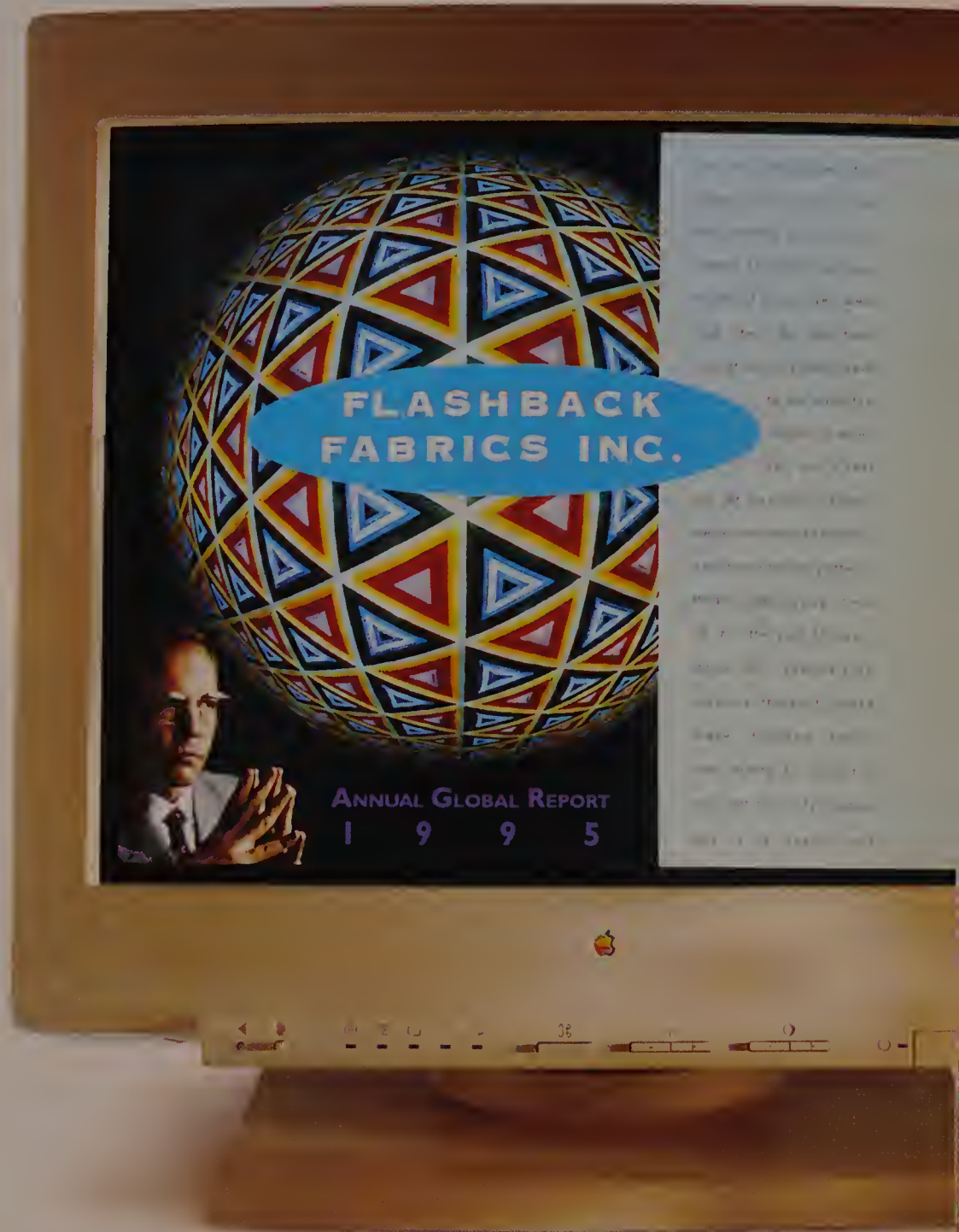


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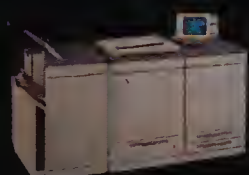


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# News

## systems

# 15 New Mac Systems: The Race Intensifies

APPLE PLAYS CATCH-UP;  
POWER COMPUTING  
ACCELERATES LOW END

by Galen Gruman



Only yesterday, it seems, vendors tore up their lineups and introduced a series of faster Macs. It's happened again. On the heels of Power Computing's 225MHz PowerTower Pro, introduced on July 22 (see "Power Computing Widens the Gap," *News*, September 1996, and *Reviews*, elsewhere in this issue), Apple has increased the speed of its Power Macs and, working with DayStar Digital, has introduced its first multi-processor Mac, the Power Mac 9500/180MP. And Power Computing has upped the ante in the consumer market, with a new line of fast, Performa-like systems.

**New Business Lineup** Apple (408/996-1010, <http://www.info.apple.com>) has increased the speeds of its 7600, 8500, and 9500, whose speeds it had increased once before in late May:

- The three-PCI-slot 7600 now runs at 132MHz instead of 120MHz. A base model 7600/132 costs \$2999.

- The three-PCI-slot 8500 now comes in two models, one that runs at 150MHz and another that runs at 180MHz. The 180MHz model uses the new PowerPC 604e, which runs faster, megahertz for megahertz, than the regular 604 used in the slower models. A base model 8500/150 costs \$3599, while the base 8500/180 costs \$4499.

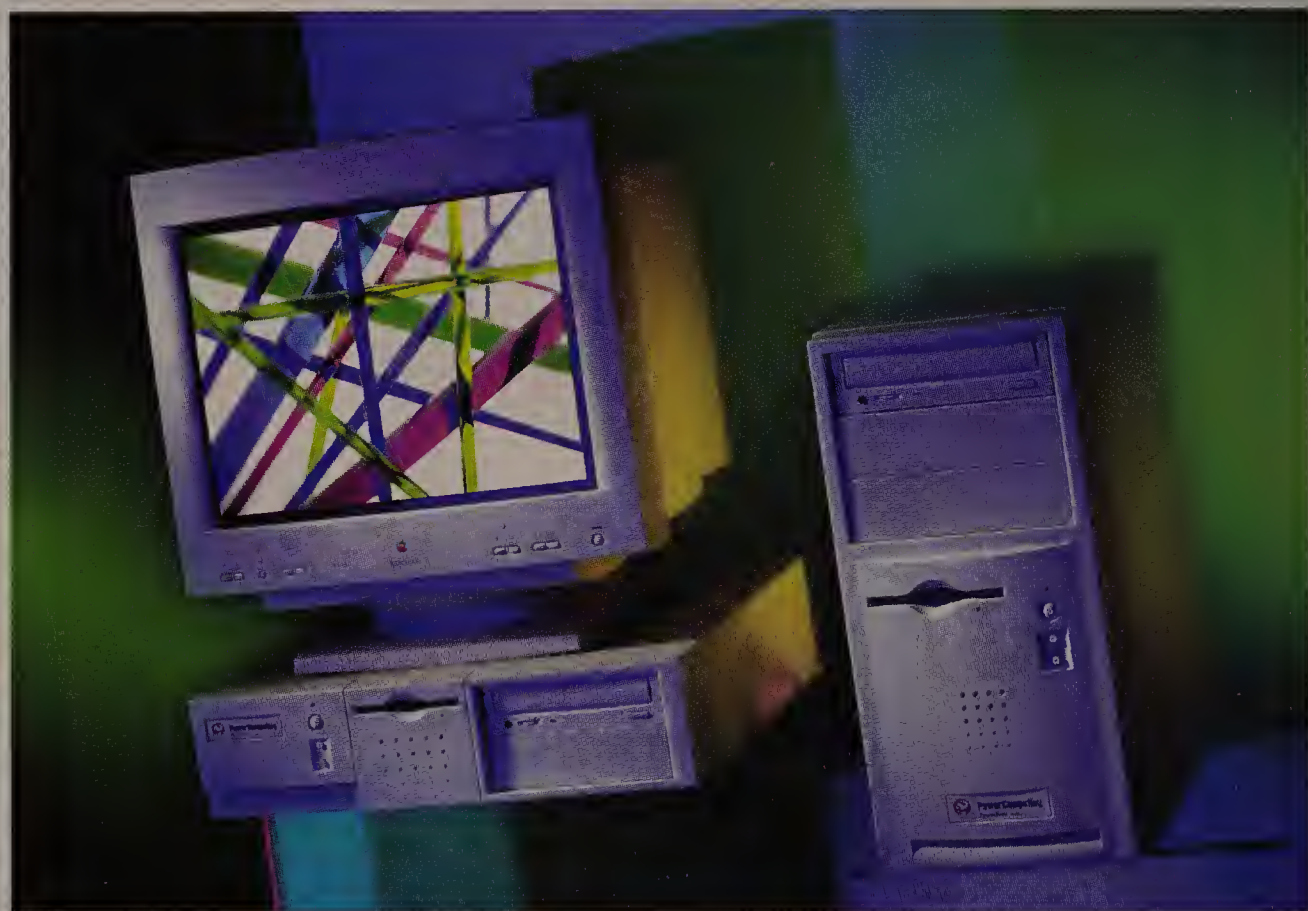
- The six-PCI-slot 9500

also comes in two models; one runs at 200MHz and one has two 180MHz CPUs, making it Apple's first multiprocessing Macintosh. Both 9500 models use the new 604e CPU. The base 9500/180MP costs \$5699, while the base 9500/200 costs \$4899.

Apple is also selling an \$899 180MHz 604e CPU card that works in any Power Mac 7500, 7600, 8500, or 9500.

(Newer Technology [316/943-0222, <http://www.newertech.com>] plans to ship an \$885 180MHz card and a \$1075 200MHz card in September.) And Apple is now putting 8X CD-ROM drives in all new Power Macs.

As previously announced, Power Computing (512/388-6886, <http://www.powercc.com>) is shipping the 180MHz, 200MHz, and 225MHz six-



Power Computing has introduced the PowerBase (left) and a new PowerTower.

KEVIN CANDLAND



PCI-slot PowerTower Pros; the 166MHz and 180MHz three-PCI-slot PowerTowers; and the three-slot 132MHz and 150MHz PowerCenters. Power Computing has also added a new 200MHz PowerTower, using the 604e; upgraded the 180MHz PowerTower to the 604e; and discontinued the 120MHz PowerCenter. The Power Computing systems, except for the PowerTower Pro series, use 4× CD-ROM drives.

Umax Computer (510/226-6886, <http://www.supermac.com>) has announced a 200MHz 604e-based version of its SuperMac S900 that should ship in September. Umax will also have 166MHz and 180MHz upgrade cards for current owners and may ship versions of the S900 at one or both of those speeds.

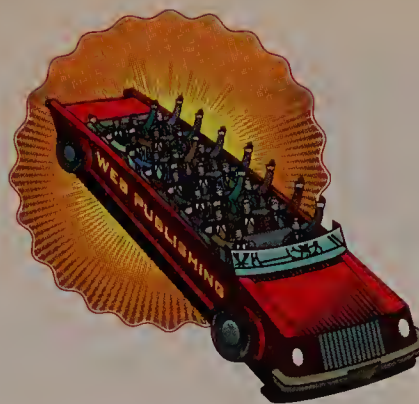
The company plans to offer the J700, a desktop-case version of its SuperMac line that will likely run at 150MHz and have four PCI slots (one taken by a video card with 2MB of VRAM), three internal drive bays, an 8× CD-ROM drive, and one CPU slot. Pricing was unavailable at press time.

**New Multiprocessor Lineup**  
Apple's new 9500/180MP uses DayStar's new dual-processor card, the nPower 360+. And DayStar Digital (770/967-2077, <http://www.daystar.com>) is making the \$1499 card available to owners of Umax SuperMacs, Apple 8500's and 9500's, and most likely Power Computing PowerTower Pros (there was a question at deadline of whether the PowerTower Pros had sufficient power supplies and airflow). The card replaces these Macs' current CPU cards.

DayStar says it is working with Umax on a \$1000 multiprocessor card for the Umax SuperMac S900's second CPU slot. Such a card would have one CPU and work with the CPU already installed on the SuperMac system.

DayStar is upgrading its line of Genesis MP systems: the \$5499 MP 360+ will replace the MP 300 and have two 180MHz 604e's, while the \$8499 MP 720+ will have four 180MHz 604e's. DayStar will continue to sell the \$6999 MP 600, which has four 150MHz 604's. The MP 528, which has

*continues on page 42*



online

## It's Raining Web Editors

ENTRY-LEVEL HTML PUBLISHING TOOLS TO FLOOD THE MARKET

by Cameron Crotty

**P**sst! Want to buy a graphic HTML editor? Just reach out your front door and pick one, because they're popping up like mushrooms after a summer rain.

Adobe (415/961-4400, <http://www.adobe.com>) is expected to ship new versions of Site-Mill and PageMill soon (see Internet Watch, *News*, July 1996). Meanwhile, Netscape is

well into late beta versions of Navigator Gold, which adds HTML editing tools to the popular browsing software (see Sneak Peek, *News*, August 1996). Earlier this summer, Claris announced Home Page (see Sneak Peek, *News*, September 1996), which is expected to ship by the end of August.

The German developer Gonet (<http://www.gonet.de>) offers golive, a \$49 menu-based HTML editing package similar to the tools from Netscape and Claris. golive offers several twists and goodies, including frames support, an image-map editor, and a palette containing nontext objects you can drag and drop into a document. But the first version doesn't support tables, and version 2 is not expected until January 1997.

Akimbo Systems (800/375-6515, <http://www.akimbo.com>), best known for its Full-Write word processor, is preparing to ship Globetrotter (\$249), HTML layout software based on the idea that page designers should no more have to fiddle with HTML than illustrators should have to hand-tweak PostScript code. Globetrotter comes with the usual slew of features (tables, yes; frames, no) and a couple of unique tricks. When Globetrotter publishes a page with a table, the software creates HTML that approximates the design for browsers that don't support tables, and includes code within the page to negotiate the appropriate tech level with the requesting browser.

Graphical HTML editors may be a boon to users suddenly expected to contribute to their company's intranet. But for professional Web designers and site managers, a plethora of ingredients does not necessarily make for a tasty stew. One producer at a major media site notes, "All of these tools are focused on single-

*continues*



## Mac Makers Bring More Speed to All

In August and September, the four Mac system makers—Apple, DayStar, Power Computing, and Umax Computer—plan to deliver 15 new Macs, bringing greater speed to a wide range of users. The results below show the performance of prototypes available in late July. The Power Mac 9500/200's relatively slow performance is due mainly to the Power Mac's slower video card.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest overall to slowest overall.

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
<b>For Professionals and Businesses</b>				
PowerTower Pro 225	9.2	9.4	13.4	3.5
Umax SuperMac S900 (200MHz)*	8.3	8.5	12.0	3.0
Power Macintosh 9500/200*	7.7	7.6	12.1	2.9
Power Macintosh 8500/180*	6.7	6.6	10.3	2.4
Power Mac 9500/150	6.2	6.5	8.1	2.8
Power Mac 7600/120	5.1	5.3	6.6	2.5
<b>For Home and Small Offices</b>				
PowerBase 240*	5.7	5.7	8.7	2.2
Performa 6400*	5.6	5.6	8.1	2.6
PowerBase 200*	5.2	5.2	7.7	2.1
PowerBase 180*	4.9	4.9	7.3	2.0

\*Prototype unit.

For more information on our testing, see "The New Speed Champs," July 1996.

—Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk



page design, but writing HTML is easy—putting together a Web site is hard.”

Creating even a modest Web site can be a massive task, particularly if you update content often. As a result, most major sites feed content into templates or spin whole pages out of databases. Carl Steadman, cofounder of the Suck.com Web site, says the new graphic HTML editors may “lower the bar” for new users, but for now he says he will stick with flowing content into

templates on Unix servers.

However, there are glimmers of hope for more demanding site managers. At press time, HeyerTech (415/325-8522, <http://www.heyertech.com>) announced that it was shipping Webmaster Pro, a \$499 site-editing and management tool based on an object database and aimed at professional Webmasters with complex sites. For more information on high-end page-publishing tools, see “Web Authoring’s New Tools,” in this issue.

## Internet WATCH

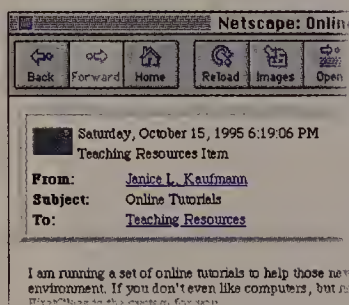
BY CAMERON CROTTY

### Flying FirstClass to the Net



Pity the groupware vendor. Since intranets started popping up on IS directors’ radar scopes, groupware packages like Lotus Notes and SoftArc’s FirstClass have become footnotes as corporations rush to implement electronic employee collaboration through the wonders of internal Web sites. This fall, SoftArc (905/415-7000, <http://www.softarc.com>) will answer the intranet call with FirstClass 4.0, a major revision of the E-mail/groupware product that allows core services to be accessed through Internet protocols. While the FirstClass server will be able to publish standard Web pages, any FirstClass content, such as conferences, will also be accessible to Web browsers or even standard Usenet (NNTP) news readers. Users will also be able to send and retrieve E-mail with SMTP and POP3 clients, and FirstClass 4.0 will support MIME-compliant messages and the LDAP directory protocol.

Beyond broader Internet protocol support, FirstClass 4.0 will also sport new features. Users will get improved document-editing tools that support hot links, embedded graphics, and tables. System integrators and administrators will get a full programming environment based on BASIC. FirstClass 4.0 will also include calendaring and scheduling features.



With FirstClass 4.0, users will be able to read conferences from standard Internet browsers.

## communications

# Modem Speeds Edge Higher

ITU RATIFIES 33.6-KBPS

V.34 SPECIFICATION

by Matt Clark

For Internet jockeys with long connect times and short fuses comes a new speed limit on the info-bahn, 33.6 Kbps. This past March the International Telecommunications Union ratified two new speeds for the V.34 protocol: 31.2 Kbps and 33.6 Kbps.

Previously, V.34 topped out at 28.8 Kbps. Most modem vendors are calling this recent change the “new” V.34, and if your existing modem is capable of exchanging data at 28.8 Kbps, you should be able to upgrade it. In most cases, upgrading to 33.6 is free.

At press time, Supra, Hayes, and U.S. Robotics were offering free flash ROM upgrades for existing V.34 modem owners through the companies’ respective Web sites and BBSs.

But don’t expect to be surfing the Web at 33.6 Kbps any time soon. Previous Macworld Lab modem reviews show that the devices rarely connect at their top-rated speed, primarily due to the current state of the telecommunications infrastructure in a majority of U.S. cities. In the words of a telecommunications company representative, “The only way you’re likely to see a 33.6 connect rate on a regular basis is if you live in a condo within your local phone company switch.” The primary benefit of the 33.6-Kbps



upgrade is to fine-tune the V.34 specification. In a white paper (available at <http://www.usr.com/business/3021.html>), U.S. Robotics says simply that “connections between two U.S. Robotics products running the new software will consistently be from 2400 to 4800 bits per second faster than they were using the previous version of software.”

## MACWORLD EXCLUSIVE

# Power Computing's Notebook

CLONE TO RUN MAC OS  
AND WINDOWS NT

by Galen Gruman

A disappointing year for Macintosh notebook users may come to an end with a new alternative to Apple’s current lackluster PowerBook 5300 series. Power Computing (512/388-6886, <http://www.powercc.com>) is developing its own notebook that will run the Mac OS and Windows NT. The new system will be based on the Common Hardware Reference Platform (CHRP) developed by Apple, IBM, and Motorola, a standard that was finalized in July.

**Sketchy Details** Power Computing would confirm only its intent to develop such a notebook, and said it hopes to announce them in January or February 1997; the company



would not provide technical details. However, the system is likely to be based on 200MHz and faster PowerPC 603e CPUs.

Power Computing has put together a notebook engineering and design team, and is likely to partner with IBM or another systems maker in some capacity. The company has done so on other projects; for example, the new PowerTower Pro chassis was codeveloped with IBM, which will use the same chassis on its forthcoming Aptiva PCs, and Power Computing has worked with IBM to get faster versions of the PowerPC 604 and 604e in its PowerTower and PowerTower Pro systems.

**Apple's Notebook Plans** Apple is also working on a new series of PowerBooks, including one subnotebook intended for the Asian market that's being codeveloped with IBM. Apple halted shipment of the 5300's earlier this spring because of a series of technical problems; the company plans to reintroduce the series starting in August.

**The Mac Reborn** In separate news, Power Computing and Frogdesign have been discussing the possibility of creating actual Power Macs based on the *Macworld*/Frogdesign design featured in "The Macintosh Reborn," *Macworld*, September 1996.

Power Computing's engineers have said they could design such a system, and Frogdesign is eager to design a Macintosh for Apple or another Mac systems maker.

*Macworld* magazine would have no role in the development of any such systems, as we assigned all patent rights in the design to Frogdesign in consideration of its design and modeling work on the project.

publishing

## The Divided Market

NEW SCANNERS

TARGET A WIDE RANGE

OF APPLICATIONS

by Stephen Beale

**N**ew scanners from Agfa and Umax show the technology moving in two directions: high-end and low-end.

At the low end we have the SnapScan from Agfa (201/440-2500, <http://www.agfa.com>), a 24-bit, 300-by-600-dpi color flatbed that will sell for an estimated street price of \$390. Targeting home users, it features an 8.5-by-11.7-inch scan area. Agfa's StudioStar, aimed at office users, is a \$1000, 30-bit color flatbed that features 600-by-1200-dpi resolution.

Umax (510/651-9488, <http://www.umax.com>) is aiming higher with its new PowerLook 2000 flatbed. The \$5495 scanner, targeting graphic artists who want to reduce their reliance on service bureaus, captures slides, transparencies, and reflective copy at 36 bits per pixel and 1000-dpi optical resolution. The big selling point is a special version of Binuscan's PhotoPerfect software, which automatically color-corrects images.



The PowerLook 2000 is bundled with a special version of Binuscan's PhotoPerfect software.

SUZANNE ROADY

## Sneak PEEK

### PageMill 2.0 Goes the Distance

BY DEKE MCCLELLAND

Adobe PageMill (415/961-4400, <http://www.adobe.com>) was the first WYSIWYG HTML editor out the door. But Internet seniority and a quarter will buy you a jawbreaker. With PageMill 2.0, Adobe is acknowledging that you have to stay in front to stay on top. After a succession of delays, Adobe has created a tidy collection of page design tools that are at least as comprehensive as its competitors', and frequently are easier to use.

**Filling In the Holes** The \$149 program addresses nearly all of the first version's obvious oversights. In addition to the line breaks offered by version 1, the new PageMill offers true HTML paragraph breaks. You can change the color of individual characters, right-align selected paragraphs, and flow text around a graphic. After specifying a base font size, you can incrementally increase and reduce it, as long as your browser supports Netscape's HTML extensions.

If you enter type in PageMill, you'll appreciate the new spelling check and search functions. You can even search for graphics, sound, video, and other media by dragging them directly into the Find field.

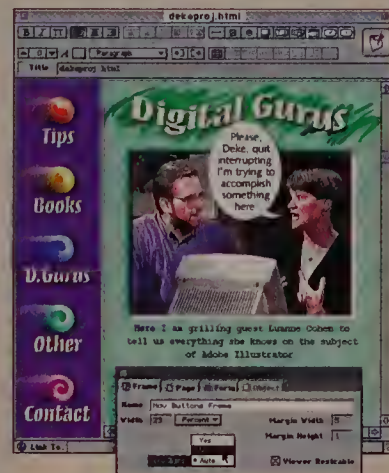
#### New Design Options

In addition to offering full support for HTML 3 tables, PageMill 2 lets you copy and paste numerical Excel tables. But PageMill's real strength is its ability to create graphic tables and DTP-style columns. Drop an object into a cell, and the table automatically reformats to make everything fit. Frames are another welcome addition: the previously daunting task of switching HTML pages in and out of frames is now surprisingly easy. And unlike Claris Home Page, which requires you to preview frames in a browser, PageMill lets you see what you're doing.

Multimedia providers will appreciate PageMill's ability to handle a wider range of animation and sound formats, as well as its support for Navigator plug-ins, which makes it possible to embed Shockwave objects, QuickTime movies, and PDF files.

PageMill is close to eliminating any need for HTML, but manual markups aren't quite dead yet, since the beta we looked at still didn't support underlined characters (other than hypertext) or blinking text. Luckily, PageMill lets you view and edit HTML source code.

Other than the lack of a sophisticated library function, we found little to criticize. The Macintosh version is scheduled to ship by September, with a Windows release coming about a month later.



PageMill 2 lets you segment pages into independent frames, allowing viewers to scroll, as in the green frame at right, or disable scrolling, as in the purple frame.



## "NEW MAC SYSTEMS"

continued from page 39

four 132MHz 604's, has been discontinued. DayStar will offer upgrades to current MP 300, MP 528, and MP 600 owners. DayStar also plans to ship the \$9999 MP 800+, which will use four 200MHz 604e's, in September. In September or October, it plans to release a midsize tower version of its MP line, with fewer drive bays and DIMM slots. Like the current oversize tower, the midsize model will have six PCI slots.

**New Consumer Lineup** Having established itself as the purveyor of the fastest business Macs, Power Computing is trying to do the same in the consumer market. Its new PowerBase series of Macs offers speed equivalent to the performance of the PowerTower 180 for \$2200 or less.

The PowerBase series uses the new version of the PowerPC 603e, which is faster than the versions used until now by Apple in its Performa 5000 series and in its PowerBook 5000 series. Power Computing will offer PowerBases at 180MHz for \$1495, 200MHz for \$1795, and 240MHz for \$2195. The systems are expected to ship in September.

The standard configuration will be three PCI slots, built-in fast video circuitry with 2MB of VRAM, a 1.2GB hard drive, an 8x CD-ROM drive, a 256K cache card, and 16MB of RAM. Also standard will be on-board 3-D acceleration and a PS/2 serial port, the kind favored by joystick makers on Windows PCs. Power Computing hopes this will encourage PC input-device makers to write Mac drivers and thus broaden the gaming options for PowerBase users. Apple is rumored to be looking to add a PS/2 connector to some future models as well.

The PowerBase series will

come in a choice of a low-profile desktop case (with no drive bays) or a minitower (with three front bays and one internal bay for added storage devices).

Apple isn't sitting still in the Performa market. It has announced the Performa 6400, a 17-inch tower that combines a 180MHz or 200MHz 603e CPU with two 7-inch PCI slots, 16MB of RAM, 1MB of VRAM, an external SCSI port, a subwoofer, an 8x CD-ROM drive, and an internal 28.8 modem. The 180MHz version costs \$2399 with a 1.6GB IDE hard drive. The \$2799 200MHz version



SUZANNE ROADY/SCREEN IMAGE: TONY STONE IMAGES

Umax will offer the J700, a desktop-case version of the SuperMac line.

bumps the drive up to 2.4GB, and adds a 256K Level 2 cache. The CPU is soldered to the motherboard, so you can't upgrade the processor. Macworld Lab found that a late prototype of a 200MHz

6400 delivered performance near that of a 150MHz 604 Power Mac.

And Umax will introduce its own line of Performa-like systems in September this year. Code-named Typhoon, the system will be available in a flat desktop case and in a minitower case, cost less than \$2000, and feature a 160MHz 603e CPU, 16MB of RAM, two PCI slots, a 256K cache card, 1MB of VRAM for the on-board video circuitry, and a 2.2GB hard drive.

The Typhoons use a CPU card, so you can add a faster CPU later. Power Computing's PowerBase machines also use CPU cards, but it is unclear whether the two companies' cards will work in each other's machines.

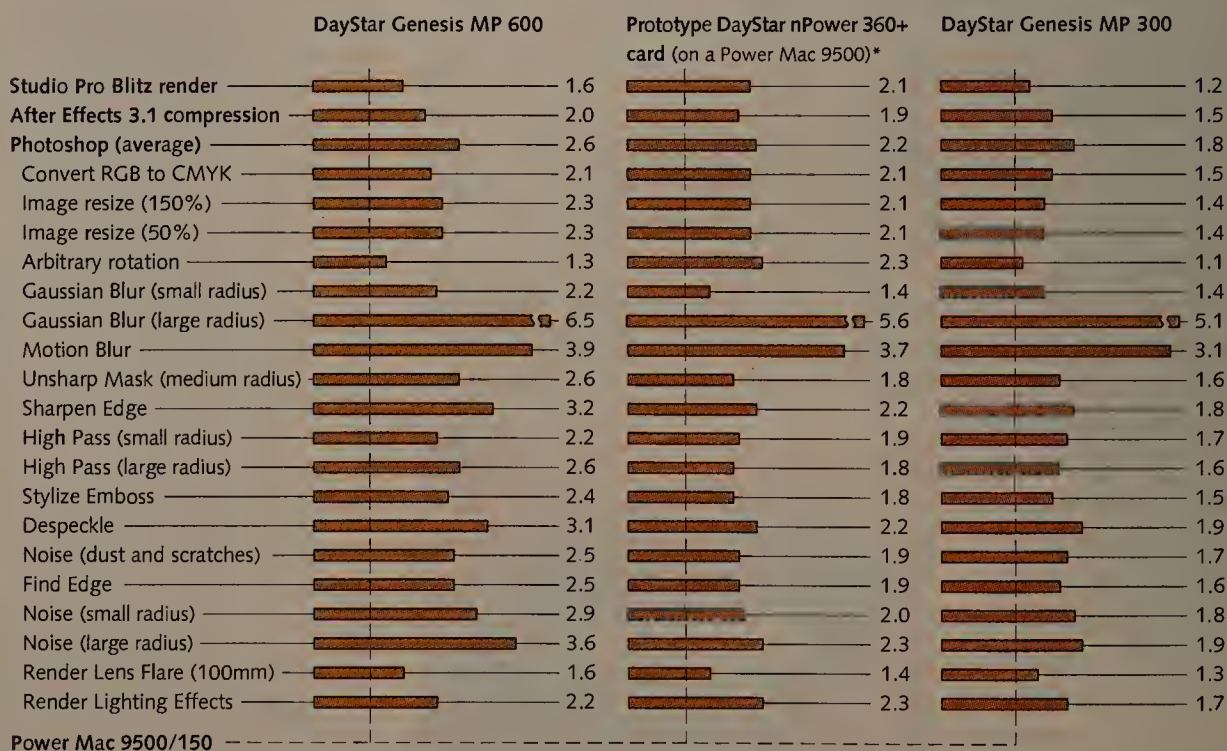
Additional reporting by JIM FEELEY.



## New Multiprocessor Macs Shine

DayStar Digital is taking a great stride toward making multiprocessing a Mac standard with its new nPower 360+ card, which sports two 180MHz 604e CPUs. Apple will use the card in its Power Mac 9500/180MP, and both Umax Computer and DayStar also plan to ship systems using it.

Longer bars are better. Speed shown as times as fast as a standard Power Mac 9500/150 (represented by the dashed line).



\*Apple's new Power Mac 9500/180MP had identical performance in our tests.

For more information on our tests, see "Photoshop at Warp Speed," June 1996. For Macworld Lab's Overall Scores, see the "High-Performance Systems" review in this issue.—Macworld Lab testing supervised by Mark Hurlow



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# Special REPORT

## A New Spin for 3-D Graphics

APPLE, FRACTAL, SPECULAR, AND STRATA UNVEIL THEIR LATEST SOFTWARE

Artists and animators who want to create spectacular 3-D effects have had to struggle with software that seems more appropriate to rocket science than to graphics applications. But this situation is rapidly changing, thanks to new products that are easier to use and offer faster performance.

### QuickDraw 3D Adds Tools for Vendors

by Stephen Beale  
and Jim Feeley

**W**hen Apple introduced QuickDraw 3D last year, a major goal was to provide a robust environment for the creation of 3-D authoring tools on the Macintosh. However, developers found that the program fell short in enabling high-performance 3-D capabilities. Now Apple has introduced



QuickDraw 3D 1.5, which moves closer to the ultimate target of making the Macintosh a serious alternative to Unix-based Silicon Graphics workstations.

QuickDraw 3D (see "The Mac's 3-D Edge,"

August 1996) is an extension to the Mac Operating System that provides a backbone for development of 3-D applications. This backbone includes a standard file format called 3DMF, a library of 3-D objects, basic tools for reshaping those objects, and simple rendering functions that convert the objects into 3-D images. Any 3-D application that supports QuickDraw 3D can use these functions.

New features in version 1.5 include a plug-in architecture that permits easy addition of new rendering engines. Any 3-D graphics program can be written to take advantage of the plug-ins. The upgrade also supports a new kind of graphics primitive called a *trimesh* that allows faster rendering.

Apple has improved display of 3-D graphics with a feature that reduces the level of detail in faraway objects. As objects get closer, the number of polygons automatically increases.

Memory management is also improved. In the previous version, 3-D applications had to keep two copies of each object in memory; now they can write QuickDraw 3D applications that use only one copy.

Other features include support for keyframe animation and inverse kinematics.

The latter makes it easier to create applications where you can link objects; pull on a hand in a 3-D model, and the arm automatically follows.

To take full advantage of QuickDraw 3D, developers will have to rewrite much of the software that underlies their applications. But at least one, Matt Hoffman of Electric Image, has given Apple high marks for considering the needs of developers in crafting the upgrade. Apple still has far to go, but the ultimate promise is Mac-based 3-D graphics tools that rival the best of what Silicon Graphics has to offer.

### Natural Media Enters 3-D Space

by Cathy Abes

**Macworld EXPO** Fractal Design (408/688-5300, <http://www.fractal.com>), the company that brought natural media tools to paint and illustration software, is about to do the same thing in the 3-D world with Fractal Detailer, a program that allows you to paint in real time directly onto three-dimensional objects.

Detailer (introduced at Macworld Expo) allows 3-D pros to quickly create and apply texture and bump maps, and 2-D illustrators to easily render 3-D elements and paste them into their 2-D

images. Detailer can import objects from a 3-D program (QuickDraw 3D or Ray Dream formats) or derive them from one of its primitives. The program can also



Fractal Design Detailer lets you paste floating selections (such as this bump map) and layers onto texture maps.

create texture, bump, glow, highlight, and reflection maps from imported images or photos, images painted in Detailer, or supplied patterns or textures. And because Detailer supports multiple floating selections, it preserves floaters and layers in imported Painter and Photoshop images. Detailer has most of Painter's natural media tools, including brushes, pens, pencils, paper textures, and Image Hose, and more than 20 image-editing effects.

With both the 2-D image window and the 3-D model window open, you can paint surfaces and manipulate objects in either window and see the other one simultaneously update. Once you've rendered your 3-D image—antialiased and with masks—you can save it in a 2-D format (including TIFF, PICT, JPEG, and Photoshop) or paste it into a paint or image-editing program.

Due to ship in September, Fractal Design Detailer will retail for \$449 and include an



arsenal of 3-D models, brushes, textures, patterns, and photos. Buy it before December 31, and Fractal will throw in a free copy of Ray Dream Designer 4.1.

## Veterans Spruce Up 3-D Products

by Cathy Abes  
and Stephen Beale

**Macworld EXPO** Two veterans of Macintosh 3-D graphics, Strata (801/628-5218, <http://www.strata3d.com>) and Specular International (413/253-3100, <http://www.specular.com>), have announced major upgrades of their flagship products.

Strata StudioPro 2.0 (introduced at Macworld Expo) has been completely recoded, resulting in improved performance and a streamlined interface. Features added haphazardly to previous versions have been integrated. Instead of wading through a confusing array of modeling extensions, you can apply extrusion, lathing, sweeping, and deformation functions from the main modeling window. The animation palette of old has been replaced by a project window that offers a timeline interface similar to Adobe AfterEffects'.

Rendering capabilities have also been improved. Instead of using the ray tracer for such effects as transparency, reflection, and refraction, you can use a much faster scan-line renderer.

A particle-generation system lets you create realistic-looking smoke, fire, hair, and similar effects, and an environment palette can generate backgrounds, terrain, lighting, and sky.

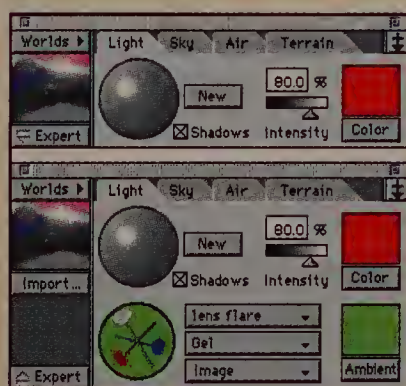
The upgrade features a plug-in architecture that ac-

cepts extensions to the texture, modeling, animation, and rendering areas. The retail price is \$1495; users of previous versions can upgrade for \$295.

Specular is billing Infini-D 3.5 as much more than an incremental upgrade. Ray tracing is now two to five times faster than the previous version. New optical effects include SuperFlares—lens flares that you can apply to any light source. You can choose from preset lens flares or create your own by customizing controls such as color, intensity, glow, halo, streaks, reflections, rotation, and scale.

Boolean rendering allows you to designate any object as a negative object, which you can then subtract from another object to cut a hole in it. Shadow catching allows you to catch and render shadows for complex objects, making it easy to composite a 3-D object onto a photo or live video with a realistic-looking shadow.

Specular has reduced the price of Infini-D to a \$695 list price (about \$399 street). For an \$895 list price (about \$599 street), you get the Infini-D 3.5 Production Studio, which includes Specular BackBurner 3.5, a distributed rendering system; the Specular Replica CD library of 3-D models and surfaces; and the updated Specular Pro-Resource CD, which includes scenes, animations, surfaces, tips, and techniques.



Strata StudioPro 2.0 features an environment palette for background effects.

## storage

# The Drive to Consolidate

FRENZIED ACTIVITY

MARKS MASS STORAGE'S

COMING OF AGE

by Tova Fliegel

**L**ately, the mass-storage market has seemed to be spinning out of control. Witness some of the events of the past year: Seagate bought Conner; StreamLogic sold its disk-drive business, Micropolis, to Singapore Technology; Hewlett-Packard shut down its disk-drive operation; FWB sold off its hardware business to StreamLogic; and SyQuest, once considered the player in removable storage, suffered financial losses and began expanding its product line to compete with Iomega's Zip and Jaz drives.

In case you've been wondering what all this activity is about, it's the sign of a mature market—companies merging or dropping out, while the remaining players, seeking economies of scale, expand or narrow their product lines. In short, consolidation is normal in an aging industry.

### Expect the Unexpected

This industry is changing at a hyperaccelerated pace fueled by spiraling demand. As the general market comes to share many of the same storage requirements previously reserved for high-end desktop publishers and digital photographers, users can expect greater innovation and specialization from vendors eager to stand out.

More specifically, removable storage will become increasingly important, thanks to digital video, multimedia,

and the Internet. "The subsystem market has changed the way business is being done," says Phil Devin of Dataquest.

For example, Iomega has entered the Mac removable-storage business with a bang, presenting SyQuest with its only real competition in years.

Users will also see mass-storage vendors move into foreign territory. One such company, Western Digital, known for making IDE drives, has entered the SCSI market to target higher-end workstations and file servers.

As some companies move into new areas, others are retreating. FWB's managers



say the hardware business was profitable, but that as engineers at heart, they aren't interested in competing in such a high-pressure market. FWB sold off its Hammer solutions to StreamLogic and will focus instead on software.

### The Driver's Seat

Two distinct patterns are emerging from all this movement. Drive manufacturers are choosing to do a high-volume business selling disk drives, or they are offering unique storage solutions to relatively fewer users at higher margins.

As vendors jockey for position at these two ends of the spectrum, you may need a scorecard to keep up, but none of this is bad news. In fact, it means customers are driving the market, and you are likely to get more of the products you really need and want.



## systems

# Mac OS 8's About-Face

MORE DELAYS AND A  
SHIFT TOWARD  
INCREMENTAL UPDATES

by Macworld Staff

**F**orget what you've read before about the new Mac OS and its fountain of features. Forget Apple's promises to have it to you this year. Mac OS 8, formerly known as Copland, is at least a year away and will likely not be what Apple has promised (see "The New Mac OS Unveiled," July 1995).

Apple is understandably keeping its plans vague, given its series of broken commitments. But here's the latest.

**Harmony in 1997** Apple hopes to deliver a new version of System 7, code-named Harmony, in the first half of next year. While Apple executives speak of a January release, Mac OS product manager Vito Salvaggio will commit only to the first half of the year—which could be as late as June.

Salvaggio says Harmony may include a new object-oriented Finder to provide more dynamic relationships among elements, à la OpenDoc; more PowerPC-native components so it runs faster; the Cyberdog Internet-integration tool and perhaps other Internet functions; and more multimedia support through the QuickTime Media Layer architecture. Harmony might use some of the interface styles promised for Mac OS 8 and available now in the shareware program Aaron.

Harmony will not support some Mac models—any using the 68000 or 68020 chip, and

perhaps some using the 68030, Salvaggio says. While Apple engineers tell *Macworld* that Harmony will not support QuickDraw GX, Salvaggio says Apple plans to support it. Harmony will also include some V-Twin contextual search capabilities, but only as part of the Cyberdog mail services, not as a Finder-wide resource, he says.

**Mac OS 8: The Series** Harmony represents a face-lift and a set of improvements to the current Mac OS. Mac OS 8 is promised as a new architecture for the Mac, letting Apple clear out a decade's worth of cobwebs from the

guts of the current System software. But in recent months, Apple has moved away from a grand release of a new OS and toward a subscription-like model where components are shipped every few months and distributed via the Internet or inexpensive upgrade packages. Salvaggio confirms that Apple's new CEO, Gilbert Amelio, has asked the Mac OS team to explore that incremental approach.

Meanwhile, Apple is close to finishing the first real beta of Mac OS 8, called Developer Release 1 (DR1) and intended for testing by core

Mac software developers. DR1 may ship to developers by the time you read this. (Apple released a pre-beta to compiler makers earlier this spring.) DR1 had been expected this past winter, and Salvaggio says the current schedule for Mac OS 8's public release is now in the second half of 1997. Apple engineers tell *Macworld* this is an optimistic schedule.

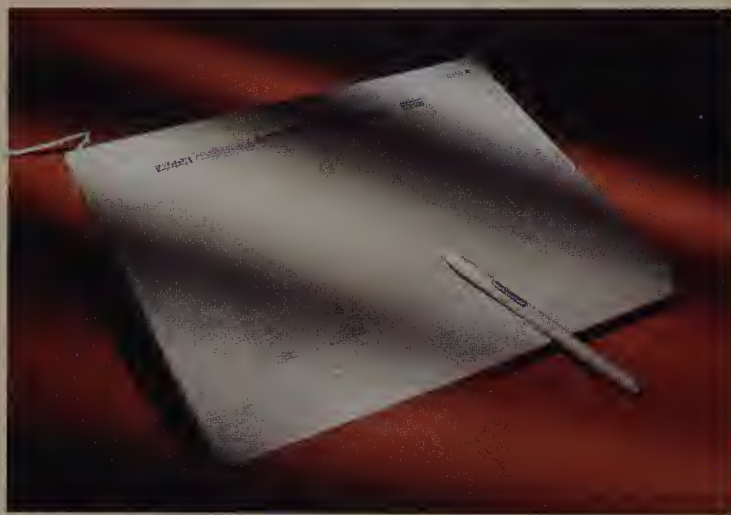
Salvaggio acknowledges that Mac OS 8's first public release may be short some promised features, although he says no decision has been made yet. He expects there to be an upgrade to Mac OS 8—a 1.1 version—with missing features and perhaps new features within a few months of Mac OS 8's release.

Apple's Mac OS 8 team is now porting the System 7 programming interfaces—used by all Mac programs to communicate with the OS—to Mac OS 8's new kernel, which manages the basic OS services. With the new kernel, Mac OS 8 should deliver the preemptive multitasking and multithreading that enables multiple audio, video, communications, and other tasks to happen simultaneously—a must for the Mac OS to really exploit the power of OpenDoc, the Web, and multimedia technologies. Windows 95 and Windows NT have had this key advantage for at least a year.

Other key differences promised for Mac OS 8 are a new virtual-memory architecture and a new input/output architecture. Both should help reduce crashes and let programs work more efficiently.

**CHRP Stumbles Forward** Also late from Apple is a version of the Mac OS to run on the Common Hardware Reference Platform, designed by Apple, IBM, and Motorola to make it easy for systems makers to design Mac-compatible

*continues*



ARNOLD TIOSEJO

## Wacom Pen Adds a Button



Digital artists who don't fancy themselves as human octopuses may be interested in the latest pressure-sensitive stylus from Wacom Technology (360/750-8882, <http://www.wacom.com>). Wacom's UltraPen Model UP-801E offers additional functionality thanks to the DuoSwitch, a double-sided rocker switch. Using a control panel, you can define different actions for each side of the switch. Push on one side, it performs a double-click; push on the other, it executes a user-defined macro or keystroke combination. Each side has a different feel to make it easily distinguishable. Like its predecessors, the pen includes a pressure-sensitive tip switch and eraser. The UltraPen Model UP-801E is now standard equipment with Wacom's ArtPad II and ArtZ II tablets. Current users can upgrade for \$50 until September 30 and \$90 thereafter.—STEPHEN BEALE



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PCs using standard components. Apple chief operating officer Marco Landi tells *Macworld* that the developer version of the CHRP OS will be final in September and that the three companies finally agreed on the CHRP specification in late July. Sources at other companies confirm this. (Although the companies previously said they had agreed on the final spec, they left several key decisions unmade.)

Whenever Mac OS for CHRP ships, it may be out of step with Harmony. Salvaggio acknowledges that the CHRP OS may remain based on the current System 7.5 version even after Harmony ships next year. Only when Mac OS 8 ships will the Mac-specific OS and the CHRP OS be identical, he says. If Apple allows this divergence, CHRP vendors will likely wait for Mac OS 8, according to several licensees.

## NEWS ANALYSIS

## Where to Now, Apple?

KEY EXECUTIVE REPEATS  
NOSTRUMS OF OLD  
WHILE LOOKING AHEAD

by Tova Fliegel

**A**n old industry joke about Apple Computer goes, What's the difference between Apple and the Boy Scouts? Answer: the Boy Scouts have adult supervision.

Supposedly, Apple is now under "adult supervision." Given the promise of new CEO Gilbert Amelio's organization, such comments would be funny primarily for their nostalgic value, because they inspire a laugh at the old Apple—so unlike the new

company, in which the cadre of recently appointed executives claims to be restoring words like *reliability*, *responsibility*, *accountability*, and *measurability* to the Apple lexicon.

This new organization has promised to reform Apple from the inside out—to do away with the Apple that was enamored of technology for technology's sake and, instead, to reemphasize customer needs; to change Apple's reputation for withholding information by ushering in a new era of accessibility and openness about future plans; to get serious; to return to profitability (another new word for Apple); and to get focused.

Further, the new executives have said Amelio's Apple will undergo this personality transplant while retaining the positive aspects of the Apple mystique—Apple the innovator, Apple empowering users to change the world. Essentially, the promise is that the evil, arrogant, self-absorbed Apple will die, and a beneficent, customer-aware, profitable technology leader will rise from the ashes.

**Hints of the Future** Apple is certainly not the same company it was, which is not an altogether bad thing. But what will the new Apple and the new Macintosh really become?

*Macworld* met with the new chief operating officer, Marco Landi, to get his take on Apple's upcoming direction. Many of our questions were tabled, to be answered in some future interview—perhaps an answer in itself. Landi handled other questions strategically, repeating the same points he made at PC Expo in June to describe the Apple-centric view of the market.

However, Landi did clue us in on a few advances and strategies:

- He said the developer version of the Common Hardware Reference Platform (CHRP) OS will be final this September and that Apple, Motorola, and IBM agreed on a final CHRP specification in late July.

- He characterized CHRP as a clone-enabling technolo-



Marco Landi is responsible for Apple's product units.

gy and a way to continue to open up the platform. Apple seems to be crystallizing its commitment to that goal.

- Landi also reinforced Apple's emphasis on Pippin and Newton technologies, saying Pippin will become "the Net surfer." The idea of Mac as super TV seems to have taken hold at Apple and could even be a key component of Apple's overall strategy—to be the Walkman of computing. At \$600 for an entry-level system, Landi said, Apple will look for strategic partners for development and production, but the company will distinguish itself at the higher price points, likely integrating digital video disk (DVD) and recordable VCR technologies into Pippin.

- A key component of the information-appliance strategy is integration of the QuickTime Media Layer (QTML), a collection of interactive technologies, which Landi said will be the area from which Apple's products derive their most distinct user value.

He also spoke about the need to persuade large corporations to adopt a dual-

platform strategy, a marked switch from former CEO John Sculley's emphasis on replacing PCs with Macintoshes for standard business applications.

And Landi said Apple needs to focus on attracting first-time computer buyers to the Mac. "We need to talk to a much larger audience," he said, "to the audience of people that still don't know the advantages of the Mac." But when asked what the Mac's advantages are, Landi responded with a familiar refrain: the GUI and the

Mac's plug-and-play quality.

"Microsoft has won the marketing battle, but they have not won the technological battle. . . . The gap is closing, but it's difficult to quantify how much," he said. How about using market share and sales numbers as indicators?

**OS Troubles** Here's a bit of related irony: Apple engineers say the Copland team is having difficulty differentiating Mac OS 8 from Windows to customers.

Landi also said Apple will rely on its strength in the desktop publishing market to make the transition to multimedia publishing. "If we can continue to have 50 percent of this market, we will be in a much better situation." Another familiar refrain.

Where is Mac OS 8—the heart of the Macintosh—going? "I have the same question," Landi said. "[Apple] will maintain the same advantages we have today—that it's much easier to learn, costs less for the large enterprise, and is easier to use."

Sounds a lot like the old Apple, the Apple that lost \$841 million in the first three quarters of this year.



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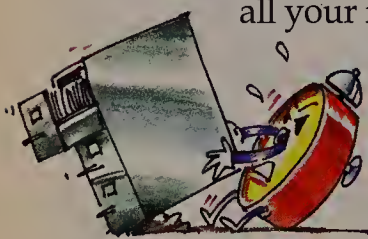
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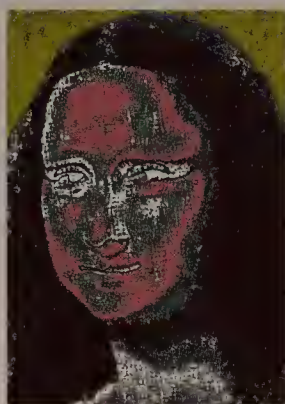


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# New Products

THE LATEST MACINTOSH RELEASES



Apple may be having its difficulties, but Macworld Expo continues to be a major launching ground for hot new Macintosh products. All of the products listed here were introduced at the recent Macworld Expo in Boston.

## COMMUNICATIONS

### QuickMail Gets Some POP

QuickMail is a popular E-mail application for the Macintosh, but until now it has lacked POP—the protocol that allows users to send and receive E-mail more easily over the Internet. CE Software (515/221-1801, <http://www.cesoft.com>) has announced QuickMail Pro, and it adds POP support to the features in QuickMail 3.6, which include custom forms creation, a spelling checker, and the ability to search for text within archived messages. Mac and Windows client software will be available shortly, with a QuickMail POP server to come after that. The current QuickMail product line will still be available as QuickMail LAN.

## GRAPHICS

### Extending to Photoshop

Extensis (503/274-2020, <http://www.extensis.com>), which offers utility products for PageMaker, Illustrator, and QuarkXPress, has added Photoshop to the mix. PhotoTools combines productivity tools and special effects in eight components. Filter effects include shadow, bevel, glow, and emboss. PhotoText gives you high-level control of text, including leading, tracking and kerning, character width, and text color. SmartBars gives you one-button access to any tool or command, building controls on the fly in response to how you work. Photo-

Tips is a collection of more than 200 tips and techniques from *Photoshop Bible* author Deke McClelland.

### Improved Color Editing

Photoshop has powerful selection and color-editing tools, but sometimes you need more. Chroma Graphics (415/375-1100, <http://www.chromagraphics.com>) has stepped forward with Chromatica 1.0, a \$150 Photoshop plug-in that lets you quickly mask objects by selecting a small sample of color. You can also create a color palette from an object or image, apply one of 1000 palettes, or manipulate existing colors.

### Fun with Photos

Tired of rooting around in a shoe box to find your favorite pics? Connectix's (415/571-5100, <http://www.connectix.com/>) \$99 Connectix PhotoMate is a photo-enhancement tool that also creates searchable digital photo albums and slide shows. Its image-editing features are designed to be easy to use, and online documentation walks users through standard photo-correction tricks, such as red-eye reduction. PhotoMate works with the company's QuickCam digital video camera and supports import of any PICT, TIFF BMP, and JPEG files. It ships on CD and includes 50 photo backgrounds, 25 sounds for spicing up slide shows, and QuickCards Limited software for transforming your photos into greeting cards.

### Pantone Goes to the Web

Pantone (201/935-5500, <http://www.pantone.com>) is extending its reach to the Internet with new products that make it easier for designers to predict the colors people see when accessing Web sites. ColorWeb is a \$30 package that allows quick access to the 216 colors that can be viewed

from nearly any Web browser. It includes a Macintosh system-level color picker and a swatch book that features printed versions of the Web-safe colors. For each color in the swatch book, Pantone provides the RGB, CMYK, and HTML hexadecimal values needed to reproduce it. Values are also provided for Hexachrome, Pantone's six-color process technology. The product is also available as a library for Pantone's Color-Drive palette management software.

## INPUT DEVICES

### Lightweight Pen Input

For some, the pen is mightier than the mouse. If you're looking for a lightweight tablet-based input device, AceCAD (408/655-1900, <http://www.acecad.com>) offers the \$129 Acecat III graphics tablet, which features a tethered, three-button programmable stylus, higher resolution (2540 lines per inch, versus 2000 lines in the previous version), and an

best of show

## BEST PRODUCTS

At Macworld Expo Boston 1996

FINDING THE BEST IS NO EASY task, but *Macworld* editors met the challenge to identify the most exciting new hardware and software to be introduced at the Macworld Expo. After poring over press releases and sitting through demos, we whittled the list of prime new products to a couple dozen, which we then hand-tested to find the very best. We looked for significant innovation and a clear sense of Mac-quality coolness. Surprising was the absence of Internet products and the very short list of truly new software.

To be considered for a Macworld Best of Show Award, a product had to be making its public debut at the Macworld Expo; products that were announced after July 7 were eligible as long as they had not been displayed in a broad public forum until the Expo.

### BJC-4550

Imagine a \$500 color ink-jet printer that supports 11-by-17-inch paper and has good quality. The BJC-4550 from Canon (516/328-5145, <http://www.canon.com>) features 720-by-360-dpi resolution in color and black and white, at a print speed of 1 ppm for color and 5 ppm for black and white. Its automatic sheet feeder can hold up to 100 letter-size or 50 11-by-17-inch sheets, yet it eats minimal space on your desk.

### STYLUS COLOR 500

Everyone has a color ink-jet, it seems, but Epson America (310/782-0770, <http://www.epson.com>) has broken

new ground with quality output for under \$300. The latest Stylus offers exceptional quality with its 720-by-720 resolution and a new ink formulation. Along with Stylus you get a host of software add-ons, including Adobe Photo-Deluxe and HomePublisher.

### VST ZIP 100

You can't fit a CD-ROM drive in a PowerBook's drive bay, but thanks to VST Technologies (508/287-4600), you will soon be able to add a Zip drive. The VST Zip 100 expansion module slides into the floppy bay of a PowerBook 5300 or 190 and can be swapped while the computer is running. VST plans to ship the drive early next year; pricing has not yet been determined.

### FRACTAL DESIGN DETAILER

Fractal Design's new three-dimensional paint program continues the developer's tradition of creating truly innovative graphics software (see "A New Spin for 3-D Graphics," page 44).

### NPOWER 360+

Multiprocessing is one of those arcane technologies we believe will soon go mainstream, thanks to DayStar's affordable card (see "15 New Mac Systems: The Race Intensifies," page 38).

### PERFORMA 6400

The new Performa tower from Apple packs speed and truly affordable multimedia features in a pacesetter combination (see "15 New Mac Systems: The Race Intensifies," page 38).



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MasterJuggler is the professional's choice and was picked as the preferred font manager by Macworld (5/95), MacUser (8/95) and Adobe Magazine (3/95). In addition to basic font management it also **checks your fonts for corruption** as they're opened so they'll never crash your Mac again. It **checks for missing printer fonts** to avoid the "jaggies." **Font number conflicts are automatically resolved** so the right font is always displayed. **"Font gathering"** copies the screen and printer fonts you need to send to a service bureau. Advanced font and sound compression saves valuable disk space. And you can print samples of your fonts in their typeface to create a type reference book.

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## New Products

integrated wrist rest. The tablet is also small, taking up a 5-by-5-inch area.

### NETWORKING

#### Native AppleTalk for Windows 95

Miramar Systems (805/966-2432, <http://www.miramarsys.com>) has updated its AppleTalk for Windows software to be fully Windows 95-native. PC MacLAN 6.0, now shipping for \$199, works like any other network in Windows 95, making connected Macs available through the Network Neighborhood. As in previous versions, you can also set up PC MacLAN to make the PC a server for Macs on your network.

#### Wireless LANs for Schools

Digital Ocean (913/888-3474, <http://www.digitalocean.com>) can help a school or office that needs Ethernet installed but doesn't have the ability to wire through walls or from building to building. Its Starfish II Ethernet Access Point bridges wired Ethernet stations to Digital Ocean's Manta 10BaseT wireless Ethernet adapters. The Starfish II costs \$2500 for the standard model and \$4800 for one with a powered antenna; the Manta costs \$799.

### PUBLISHING

#### New Tools for Quark Users

QX-Tools 2.0 from Extensis (503/274-2020, <http://www.extensis.com>) adds five new components to the original ten QuarkXPress XTensions. QX-Effects provides the same effects as PhotoTools (bevel, glow, shadow, and emboss), and QX-SmartBar automatically builds tool bars that contain your most frequently used commands. Other tools include QX-FineTune, which lets you easily move characters, add paragraph rules, and make text borders and change their dimensions; and QX-FindChange, which lets you change parameters such as colors, objects, text and picture box attri-

butes, frames, and style sheets. Due in September, QX-Tools 2.0 is expected to sell for about \$100.

#### Cameras in Your Pocket

Digital cameras keep getting smaller. New from Nikon (516/547-4200) are the Camera-on-a-PC-Card and the Multi-Purpose AV Compact Camera. The former captures and stores up to 40 images at 480 by 512 resolution. To transfer the images, you slide the camera out of a power supply grip and into a PCMCIA card slot or PC



Nikon's Camera-on-a-PC-Card

Card reader. The AV camera features a color LCD you can use to preview images or examine pictures already captured. It includes a stylus for adding written notes on the LCD, and you can record a voice annotation for each image. It stores up to 125 images at 480-by-640 resolution, and can transfer images to a Mac via SCSI cable or to a TV using an AV connector. Pricing has not been determined.

#### Database Tracks Workflow

Canto Software (415/905-0300, <http://www.canto-software.com>) has added workflow automation and Internet publishing features to version 3.0 of the Cumulus Network Image Database. The Cumulus database log now includes a record of when and by whom an image has been copied or previewed. You can also place the program within automated prepress workflows built around Luminous's OPEN technology. The included Internet Image Server allows you to place Cumulus image databases on the World Wide Web. You can create folders contain-



ing specified images by dragging a keyword to the Finder; Cumulus sets up a folder named after the keyword and copies all images with that keyword into the folder.

### Polaroid Scans Slides

Polaroid (617/386-2000, <http://www.polaroid.com>) has added two models to its line of high-resolution slide scanners. The SprintScan 35/LE, priced at \$1295, features an optical resolution of 1950 dpi and a density range of up to 3.0. For more demanding slide-capture applications, the \$2595 SprintScan 35 Plus features 2700-dpi optical resolution and a density range of up to 3.4.

## SCIENCE/ENGINEERING

### Architect's Tool Kit

Looking to extend the power of Engineered Software's PowerCADD? Engineered (910/299-4843, <http://www.engsw.com>) has a suggestion: its updated plug-in tools, WildTools 2.0. Among its new features are the ability to make lines squiggly so clients don't think the design is final; a tool that lets you create almost any type of door; and a tool that lets you trim multiple objects by dragging the equivalent of an eraser through them.

## STORAGE

### MO Hits the Road

Trying to squeeze your data onto a PowerBook? At the Macworld Expo, Olympus Image Systems (516/844-5000, <http://www.olympusamerica.com>) introduced Sys.230, a two-pound portable magneto-optical drive that measures 8 by 6 by 2 inches. Estimated street prices are \$359 for an external Mac version, \$389 for an external version that works with PCs or Macs, and \$299 for an internal version suitable for Macintosh clones, but not for Apple Macs because of their unique bezels. Media cost is about \$10.

### External Dynamo

If 230MB capacity isn't enough for you, Fujitsu (408/432-6333,

Olympus Image Systems' Sys.230

[www.fcpa.com](http://www.fcpa.com)) has unveiled an external 640MB MO drive for the Macintosh. The \$700 DynaMO 640 features a standard 2MB cache and supports traditional MO cartridges or new direct-overwrite cartridges, which provide better performance when writing data; reading performance is the same for both kinds of cartridges. Fujitsu estimates the cost of traditional MO media to be \$40 each, or \$50 each for the direct-overwrite cartridges.

## SYSTEMS

### Fast PCs for Your Mac

Looking for a PC that can keep up with one of the new 604e-based PCI Power Macs? Reply (408/942-4804, <http://www.reply.com>) hopes you'll choose its 200MHz Pentium-based DOS on Mac Card; it demonstrated an early version at the Macworld Expo. Reply has not yet decided on a ship date or price. The company plans several other PC-compatibility cards: for PCI Macs, a \$1395 card using a 133MHz Pentium and a \$995 card using a 133MHz 5x86, both shipping in September; and for 5000- and 6000-series Performas, an \$895 card shipping by January.

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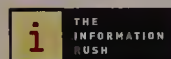


# Reviews

## The IDEs of Java

JAVA DEVELOPMENT TOOLS

DUKE IT OUT ON THE MAC



THE LAST TIME LANGUAGE

development saw such an intense emergency effort, Paul Allen and Bill Gates were young guys sweating it out in an Albuquerque motel, trying to fit a BASIC interpreter into 4K of RAM. Getting Java, the key programming language of the Web, onto the Mac is the analogous rush job of the nineties. Natural Intelligence, Symantec, and Metrowerks—in that order—all brought development environments to market in record time, although not without hitting a few obstacles along the way.

Java is a strictly object-oriented programming language—essentially a subset of C++ with some enhancements—for writing relatively small programs, or *applets*, that are interpreted in software at the Web client's computer when downloaded. This approach minimizes the time needed to transfer Java applications or applets; it also makes Java a logical cross-platform solution, since browser developers for all platforms must accommodate Java's feature set to let users work with Java-based Web pages. Browser developers must also support the simpler JavaScript, a Java-syntax scripting language for enhancing Web pages with intelligent data-exchange functions.

Considering that the three main Java contenders at the moment are based on the same language definition, they have a surprising number of differences. Natur-



STUART BRADFORD

al Intelligence doesn't have Metrowerks' installed base of programmers, but its Roaster DR2.1 is the fastest and most highly evolved of the three, supporting multiple open projects, autocommenting, and edit-window tool bars. Metrowerks' Discover Programming with Java is simply a Java module popped into CodeWarrior 9; it lacks Roaster's bells and whistles, but it offers the Metrowerks IDE (integrated development environment) debugger and the editor and project manager most familiar to Mac programmers. Symantec's Cafe DR1 may be the most ambitious effort, if not an entirely suc-

cessful one: even with a visual development environment, the graphical class browser developed for Symantec's C products, and the most advanced project manager and source-code control for team development, it's not quite there yet.

### Three Interfaces: Roaster by a Nose

Natural Intelligence's Roaster DR1, released at the beginning of the year, has the distinction of being the first incarnation of Java for the Mac. That extra six months' combat experience has given Roaster an edge in features and reliability; DR2.1, in both 680X0 and PowerPC

#### RATINGS

Outstanding ★★★★★ = 9.0–10.0

Very Good ★★★★ = 7.0–8.9

Good ★★★ = 5.0–6.9

Flawed ★★ = 3.0–4.9

Unacceptable ★ = 0–2.9

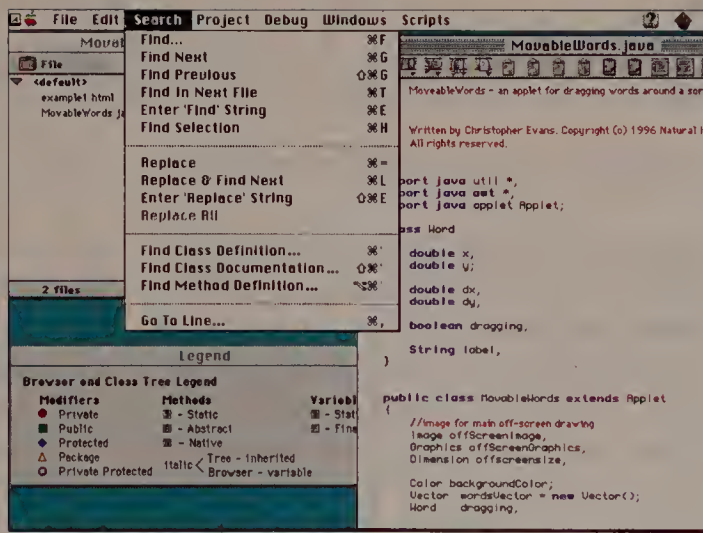


incarnations, is a seriously improved and enhanced product. It has an attractive multiple-clipboard editor (see "Roaster's Latest Edition"), a powerful and lightning-fast Find Text command that's intensely popular with developers, and an exemplary class browser and class hierarchy browser. Roaster comes with a demo version of EveryWare Development's Tango, a Web-and-database integration program that lets you write simple Java code using canned routines and, with minimal programming, post SQL and Open Database Connectivity—standard databases as searchable Web sites (see "Energize Your Web Site," elsewhere in this issue).

Metrowerks' Discover Programming with Java is the new CodeWarrior 9 development environment with Java as the only language module (the full CodeWarrior 9 has C, C++, Pascal, and a Windows compiler tool kit in addition to Java). The Java module is a plain Mac version of Sun's original, bare-bones Java Developer's Kit. That might not *sound* impressive, but it means this flavor of Java has a straightforward project manager that's intimately familiar to most serious Power Mac developers.

By forgoing some tools and hand-holding, Metrowerks' package offers a quick way for C++ programmers to master Java. The CD includes an online version of Barry Boone's excellent text *Learn Java on the Macintosh*, though it will make you yearn for a hard copy—scrolling through those long documents on screen can get awfully tedious. And although Discover Programming with Java lacks a full-scope, Roaster-style Find command and Cafe's visual-programming features, Metrowerks' large customer base almost guarantees that this Java—through either the full CodeWarrior 9 or Discover Programming's equally good 680X0 and PowerPC versions—will be generating the majority of Mac Java applets by the time you read this.

Symantec's Cafe DR1 is another Java environment based on an established C++ development tool—in this case, the zillionth release of Symantec's C++. As a result, Cafe has a highly evolved project manager and, alone among these packages, decent code-version control. Bun-



**Roaster's Latest Edition** The program editor is where you spend most of your coding time, and developers rave about Roaster's—with good reason.

dled with Cafe is the easiest-to-follow online Java introduction yet, a lower-level work than the online documentation in Roaster and Discover Programming, both of which take their text nearly verbatim from Sun. It also includes a library of drag-and-drop interface elements called Cafe Studio, the first Mac Java product to include visual (rather than text-based) programming tools for building applet GUIs.

**Three Code Machines: Neck and Neck** Disassemblers (they turn Java byte code back into Java) are useful for studying other programmers' tricks, and so far only Roaster DR2.1 offers one. This version also includes a proper debugger, correcting DR1's biggest deficiency (Cafe has a competent debugger, and Metrowerks had a serious, professional debugger from the start). But DR2.1's biggest asset is practical performance: it's simply faster than its rivals at the write-run-rewrite cycle required to create real applications. Another point in favor of the Roaster engine is that Natural Intelligence has Apple's blessing: Apple has licensed the Roaster VM tool kit (*VM* stands for *virtual machine*, the software that runs Java on the Web client) and is building Roaster technology into the Mac OS.

Metrowerks' approach with Discover Programming—to treat Java as a language licensed from Sun and dropped into a C++-oriented environment—is a logical one, but the result is good performance without either the speed tweaks built into Roaster DR2.1 or Cafe Studio's fancy interface-building touches.

Cafe DR1 corresponds roughly to Roaster DR1 in maturity (that is, bug density—the current 680X0 version, in

particular, is fairly unstable), though it now features a high-performance just-in-time (JIT) compiler. (JITs produce machine-specific compiled versions of Java's byte code, typically accelerating applet performance by a factor of three to ten.) When Cafe grows up and gets some crash-proofing and a faster code-development cycle, it could be the best of the bunch for users making the transition from Pascal or C to Java.

## The Last Word

In a better world, Apple itself would have responded to the dramatic arrival of Java. Perhaps taking its cue from Apple's inexplicably late entrance, Sun only recently ported its Java Developer's Kit to the Mac. JDK provides only bare-minimum tools for creating applications and applets; it is, however, a free download from JavaSoft's Web site, <http://www.javasoft.com>.

At this point in the race, Roaster DR2 has put a bit of daylight between itself and its rivals, who are struggling to close the early gap. Given the pace of change on the Web, all three products will likely have undergone another major round of improvements by the time you read this review. We'll keep calling the race till it's over.—CHARLES SEITER

## Cafe DR1

**RATING:** ★★ ★/6.9 **PROS:** Includes visual tools and the first just-in-time compiler for the Mac. **CONS:** Early-release glitches, especially in 680X0 product. **COMPANY:** Symantec (541/334-6054, <http://cafe.symantec.com>). **LIST PRICE:** \$99.95.

## Discover Programming with Java

**RATING:** ★★ ★/6.8 **PROS:** Well-designed cross-platform approach; the best tutorial for experienced programmers. **CONS:** A bit austere. **COMPANY:** Metrowerks (512/873-4700, <http://www.metrowerks.com>). **LIST PRICE:** \$99.

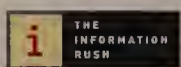
## Roaster DR2.1

**RATING:** ★★ ★/7.6 **PROS:** Trouble-free by Java standards; great editor; new database links. **CONS:** Programming is text-oriented rather than visual. **COMPANY:** Natural Intelligence (617/876-4876, <http://www.natural.com>). **LIST PRICE:** \$129.



# EZFlyer 230MB

SYQUEST'S NEW DRIVE TRIES (AGAIN) TO OUTZIP IOMEGA



UNDAUNTED BY THE results of the previous round of removable-media drive battles, SyQuest is again waging war against Iomega's popular Zip drive. The EZFlyer 230MB improves on the capacity and aesthetics of SyQuest's first consumer-level product, the EZ135, but lags behind its predecessor in speed.

## Learning from Experience

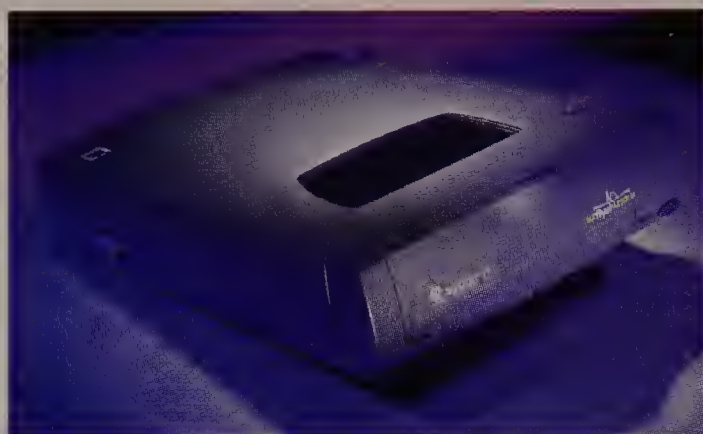
The EZ135—SyQuest's first attempt to capitalize on the market for low-cost removable media that Iomega pioneered—bettered the Zip in terms of speed and media capacity. But the Zip still managed to get to the top of the removable-drive market first, and stay there, with a lucky combination of marketing savvy, early entry into the market, and consumer-oriented styling.

This time out, SyQuest seems to have learned its lesson, at least in the industrial-design department. Unlike the boxy, boring EZ135, the EZFlyer's dark-gray case has smooth, rounded edges on the front and stylish feet for sideways orientation on your desk.

Another design innovation: gone is SyQuest's awkward lever for media insertion and removal. As with Iomega's drives, disks pop out when you dismount the cartridge from the Mac's desktop, without your having to use an additional button or lever. Still, you have to take care that the media is placed all the way inside the drive or it won't run. The drive is designed to go into sleep mode after 5 minutes of inactivity, but when you access the drive, it perks up in seconds.

Nearly everything about the EZFlyer

drive is relatively well designed, except for its clumsy SCSI ID-changing scheme. Rather than pressing a button or turning a dial, you have to disconnect the unit from the Mac, remove the media, hold down the Eject button, and turn on the power. The SCSI ID is displayed as a sequence of flickers on the drive's activity light (with four flashes signifying SCSI ID 4, for example). To change the setting,



ARNOLD TIOSEO

you push the Eject button the exact number of times for the ID you want. If you intend to move the drive from one Mac to another—which is a common occurrence in a busy design studio—you'll waste plenty of time.

The EZFlyer's handy autosensing termination activates if it is the last physical device on your Mac's SCSI chain. And although it lacks the sort of quick-start brochure that Iomega offers for its Jaz and Zip drives, the EZFlyer's functional manual will guide you through the setup process in short order.

## A Place in the World?

With a formatted capacity just shy of 218MB, the EZFlyer falls about 40MB

short of the capacity of the older SyQuest 270MB mechanism, though the 230MB cartridges are much cheaper. In Macworld Lab tests (see "EZFlyer Takes Off"), the EZFlyer whizzed past the Zip drive by a healthy margin but didn't quite catch the older EZ135. As expected, the EZFlyer fell behind Iomega's 1GB Jaz drive in most respects, but impressively managed to surpass the Jaz in database-searching tasks.

But where the EZFlyer drive fits in the removable world is another question. It *does* write to and read the EZ135's media (but not the older 3½-inch 270MB disks), and in most respects it's a very good product, but its price is a bit high for what it offers. For \$200 more, you can buy a Jaz drive, with cheaper media on a cost-per-megabyte basis. (SyQuest's answer to the Jaz, the SyJet, has been postponed repeatedly and is now slated for fall release.)

## The Last Word

The EZFlyer 230MB is a good buy, but it would be a better value if the price came down a bit. SyQuest hasn't found its Zip killer in this product, but it's worth considering if your removable-media needs require faster-than-Zip speeds at a lower-than-Jaz price.—GENE STEINBERG

**RATING: ★★★/6.7** **PROS:** One-handed media insertion and removal; relatively speedy performance; backward-compatible with EZ135 cartridges. **CONS:** Not compatible with older SyQuest 3½-inch media; eccentric SCSI ID setup; so-so manual. **COMPANY:** SyQuest Technology (510/226-4000, <http://www.syquest.com>). **COMPANY'S ESTIMATED PRICE:** \$299; cartridges \$29.95.



## EZFlyer Takes Off

Best result in test. Shorter bars are better. Times are in seconds.

	Search Database	Open Photoshop File	Save Photoshop File	Copy to Drive*	Copy from Drive*	Duplicate File*
SyQuest EZ135	314	90	61	33	31	49
SyQuest EZFlyer	365	106	76	31	33	51
Iomega Zip	524	176	104	48	50	84
Iomega Jaz*	471	63	48	27	27	36

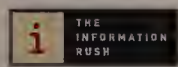
\*Using the Finder. \*\*For reference, previously tested using System 7.5.2 (see Reviews, June 1996).

**Behind Our Tests** Drives were connected to the built-in external SCSI bus of a Power Mac 7500/100 running System 7.5.3 with 32MB of RAM, 256K of Level 2 cache, and an Apple 17-inch monitor. Write verification was disabled on drives that offered this option.—Macworld Lab testing supervised by Jeff Sacilotto



# XPress-to-HTML Converters

BEYONDPRESS AND HEXWEB XT WHISK YOU FROM QUARKXPRESS TO THE INTERNET

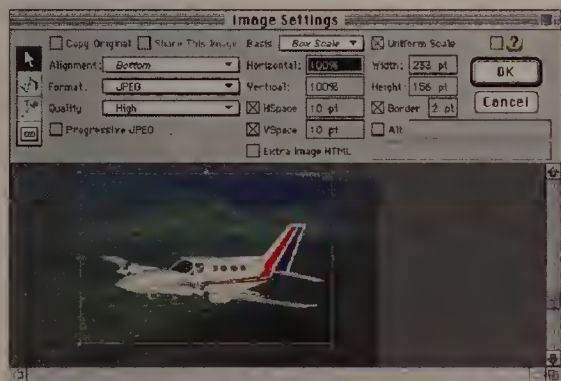


THE TASK OF CREATING pages on the World Wide

Web is getting easier, thanks to two powerful XTensions that let you export the contents of your XPress documents into HTML. The dramatically improved BeyondPress 2.0 offers an array of sophisticated Web-design options for XPress users, while HexWeb XT 2.0 takes a more basic approach that requires a bit more tweaking of the results.

## BeyondPress 2.0

When BeyondPress 1.0 was released, it was the only QuarkXPress-to-HTML game in town (see *Reviews*, December 1995). It offered reasonably effective tools for exporting XPress text and graphics, but it didn't support more complex elements such as tables, background colors



**Beyond the Basics** BeyondPress's Image Settings dialog box lets you crop and scale images, make images transparent, and add space and borders.

and images, colored text, and image maps. Version 2.0 fills in those gaps, creating polished Web pages that require a minimum of tweaking.

BeyondPress's Document Content palette gives you an overview of your document's text chains and graphics. You can add all those elements to the palette at once, or you can select specific items to export. To speed formatting, you can map each XPress style sheet in your document to a specific HTML tag in advance so that each paragraph of text is correctly formatted upon export.

Once you've added items to the Document Content palette, you can reformat them by applying HTML style tags (from a pop-up menu) and create links to other locations. The Document Content pal-

ette also lets you dress up your Web page with elements that aren't part of the XPress document: horizontal rules, extra paragraph returns, time-and-date stamps, and master elements. This approach lets you rearrange and reformat your content before exporting it without altering the XPress document itself.

Most notable among the program's new features are the ability to add background colors or images to exported documents, full support for tables, and vastly improved graphics handling. The new version lets you create GIF or JPEG graphics from the original images imported into QuarkXPress (rather than the low-res preview images the earlier version exported). Even better, the program lets you turn any imported graphic into a clickable image map: a strikingly intuitive interface lets you link areas on a graphic to specific URLs.

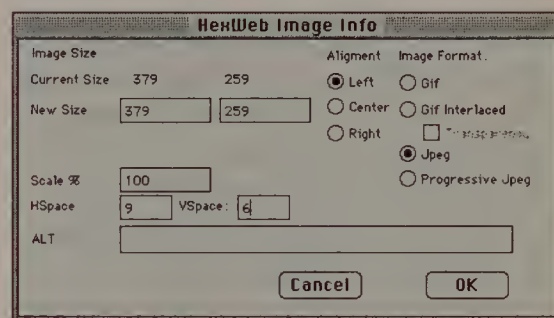
One thing hasn't changed: Astrobyte still refuses to publicize its phone number, either in the well-written documentation or the packaging.

## HexWeb XT 2.0

HexWeb XT is less expensive than BeyondPress, but its limited tool set makes formatting and configuring the exported elements more difficult. HexWeb's strength is in letting you build more than just Web pages—it helps you build a Web *site*; that is, in addition to creating HTML documents from your text, it creates a directory structure for those documents and an index of your Web site as you build it. The program also supports Navigator 2.0 Frames and builds an HTML-tagged table of contents based on the headlines in your exported documents.

Those strengths aside, HexWeb makes clumsy work of exporting files. It adds not one but *three* palettes to the QuarkXPress interface, and the main palette displays only the links you've defined in your document. To export a document, you shift-click on the XPress items you want to add to your Web page, then click on a button on the Export palette. Unfortunately, the order in which you shift-click the picture and text boxes is the order in which they end up in your

Web document. To complicate matters, the program gives you no indication of the order in which you've selected items. Adding external elements (such as QuickTime movies and Java applets) makes the process even clumsier. Setting up hypertext links is also laborious, and HexWeb comes with no printed manual—just a sparse series of HTML documents that you can view with a browser.



**Hexing Your Documents** With HexWeb's Image Info dialog box, you can tweak—but not preview—images before exporting them.

## The Last Word

Even though it doesn't support every design option found in full-blown Web authoring programs, BeyondPress has enough power to crank out fairly sophisticated Web pages. HexWeb's more rudimentary approach requires both more time up front and more tweaking of the final product.—JOSEPH SCHORR

## BeyondPress 2.0

**RATING:** ★★★★★/7.0 **PROS:** Intuitive interface; supports background colors and textures, image maps, and tables. **CONS:** Limited number of predefined tags; no tech-support number. **COMPANY:** Astrobyte (303/534-6557, <http://www.astrobyte.com>). **LIST PRICE:** \$595.

## HexWeb XT 2.0

**RATING:** ★★★/5.6 **PROS:** Builds file structure of Web site; supports QuickTime; built-in indexing. **CONS:** Awkward export process; setting up hypertext links is tedious; no printed documentation. **COMPANY:** Hex-Mac (415/864-7592, <http://www.hexmac.de>). **LIST PRICE:** \$349.



# Genesis MP 600

MULTIPROCESSING SYSTEM EXCELS AT IMAGING TASKS



DAYSTAR DIGITAL EXPERIENCED extensive product delays with its first multiprocessor clones, but now everything seems to be under control . . . and then some. Its latest engineering effort, the Genesis MP 600, proves that DayStar is very much in the forefront of Macintosh system design.

Priced close to \$7000—including a 4× CD-ROM but without a keyboard, internal hard drives, or RAM—the Genesis MP 600 is expensive if your typical tasks don't make use of its four processors. For multimedia professionals, though, the extra money is well spent.

The Genesis MP series is based on Apple's 9500 architecture—early models even shipped with Apple motherboards—and the MP 600 offers the same expandability and ports as a Power Mac 9500: 6 PCI slots, 12 DIMM sockets (for over 1.5GB of memory), plus 16-bit stereo in and out, Ethernet, and 512K of on-board cache. Like the Power Mac 9500, Genesis systems lack on-board video; the MP 600 we tested shipped with an optional \$749 Number Nine Imagine 128 card.

Like the 9500's, the Genesis's CPUs are mounted on a processor daughter-card. If you decide to increase your machine's speed in the future, it will take only a few minutes to upgrade. If you've installed DIMMs in a Power Mac 9500, you'll appreciate the MP 600's accessibility; there's no need to remove any connectors or cards, or to remove the motherboard from the case, to get to the DIMMs. The Genesis series supports interleaved memory, which can translate

to a 5 percent speed improvement with matching pairs of DIMMs installed.

The Genesis MP 600 ships with System 7.5.2 (but should include 7.5.3 by the time you read this) and the Apple Multiprocessing shared library, and plug-ins for Adobe Photoshop and After Effects. An updater that gives Strata Studio Pro Blitz 1.75 multiprocessing capabilities is available on DayStar's Web site.

Because Macworld Lab's Core Performance Index tests don't take advantage of multiprocessor support, the MP



ROBERT PERRY/SCREEN IMAGE: TONY STONE IMAGES

600 wasn't able to run as fast as a single-processor 150MHz machine—not surprising, since applications that aren't multiprocessor-aware suffer a speed hit of up to 15 percent due to the overhead necessary to deal with multiple processors.

The tables were turned when we tested the Genesis with applications that take advantage of multiple processors, most notably Photoshop. The MP 600 logged speeds an average of 2.6 times higher than the Power Mac 9500/150 in many key

Photoshop operations. The Genesis also did quite well in After Effects 3.1 tests. The Power Mac 9500/150 took 3 hours, 40 minutes to assemble and compress a movie with multiple layers and special effects; the four-processor MP 600 cut that time down to about 1 hour, 40 minutes. Although the margins were not as large as with Photoshop and After Effects, the MP 600's Strata Studio Pro times were also impressive.

With such exceptional performance, it's a shame only a few applications take advantage of the Genesis's multiprocessing capability. Some graphics and 3-D applications such as Electric Image, KPT Bryce, Specular Infini-D, and Deneba Canvas should have multiprocessing capability soon, and when Apple begins shipping its dual-processor Power Mac 9500/180MP this September, more vendors should begin to write multiprocessing-aware applications.

DayStar recently dropped the Genesis MP 300 from its price list but will continue to sell it until supplies are exhausted. The MP 300 is identical to the MP 600, except that the MP 300 comes equipped with two rather than four CPUs and costs a few hundred dollars less. At Macworld Expo, Genesis announced plans to make its product line more accessible to a wide range of users. For detailed information on new DayStar models, see "15 New Mac Systems: The Race Intensifies," *News*, in this issue.

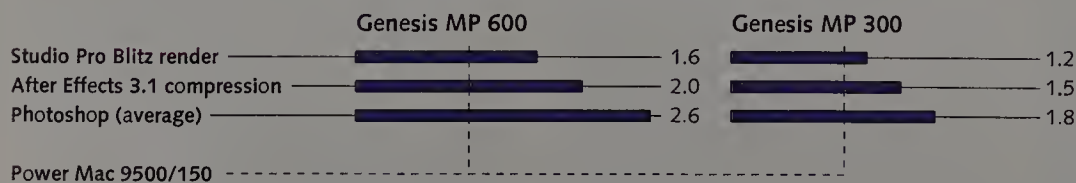
## The Last Word

The MP 600 isn't for everyone. Although its price has dropped nearly \$4000 in the short time since its introduction, it is still significantly more expensive than a Power Mac 9500/150 equipped with 16MB of RAM and a 2GB hard disk. If you make your living working with Photoshop, designing 3-D graphics in Studio Pro, or creating digital movies using After Effects, the Genesis MP 600's multiprocessing speed makes it a solid choice today, but faster—and cheaper—options are right around the corner.—MARK HURLLOW



## DayStar Shines with MP Apps

Longer bars are better. Speed shown relative to the performance of a standard Power Mac 9500/150 (represented by the dashed line).



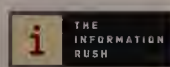
For information on our tests, see "Photoshop at Warp Speed," June 1996. For Macworld Lab's Overall Scores, see the "High-Performance Systems" review in this section. For details on specific Photoshop tasks, see "15 New Mac Systems: The Race Intensifies," *News*, in this issue.—Macworld Lab testing supervised by Mark Hurlow

**RATING: ★★★★★/7.2** **PROS:** Superb performance when running multiprocessor-aware applications. **CONS:** Only a few applications support multiprocessing. **COMPANY:** DayStar Digital (770/967-2077, <http://www.daystar.com>). **LIST PRICE:** \$6999.



# Tango for FileMaker Pro 3.0

YOUR FILEMAKER WINDOW TO THE WEB



WHEN EVERYWARE released Tango/SQL, its database interface builder for the Web, user response was immediate and overwhelming. While SQL (structured query language) is older than the Macintosh, with a large share of all corporations using SQL databases, the Mac is FileMaker territory. Macintosh users begged, pleaded, and demanded that EveryWare produce a version of Tango for FileMaker. EveryWare responded, and Tango for FileMaker, a much simpler product than SQL-based Tango, is a real asset for small businesses that want to post FileMaker-based catalogs and other data on the Web.

## A Few Quick Steps and Turns

Tango simplifies and speeds up the process of making FileMaker data accessible and searchable to Web browsers, but if you propose to use it, you'd better be reasonably fluent in HTML. The product's two parts, Tango Editor and Tango Application Server (also called Tango CGI, since it's a Common Gateway Interface application), need System 7.5 and about 5MB of RAM each. Tango also requires StarNine's WebStar 1.2.1 or higher Web-server software (for which you definitely need HTML competency), and the whole server setup (FileMaker Pro 3.0, WebStar, Tango) runs comfortably on a 16MB Macintosh or Power Mac.

The Tango CGI simply connects WebStar to your Tango Editor files. You do virtually all of your work in Tango Editor, which is an icon-based editor for generating documents in the plain-text language of the Web, HTML.

You use Tango to create data-exchange windows—Web pages where information from a FileMaker database comes into or gets taken from a Web site. To prepare a search window (or any other data-exchange window), you use the wizardlike Query Builder to drag and drop icons corresponding to FileMaker data-

base fields into a linear sequence that translates into pages of the appropriate HTML programming text. By double-clicking on the icons, you can see the translation (see "Blowup").

Once you have set up a few windows (these windows will correspond to data-exchange Web pages when the client views them) you can make simple modifications or new windows very quickly. For a project with as many as eight data-exchange pages, making new windows is

ups of the FileMaker-to-Web problem.

EveryWare includes a short but useful tutorial (actual *printed* documentation for a Web product!) that points out the changes you will probably need to make in your original FileMaker material (such as changing field names so they mean something to your Web-site visitors, and partitioning the database for faster searching).

## And Onward

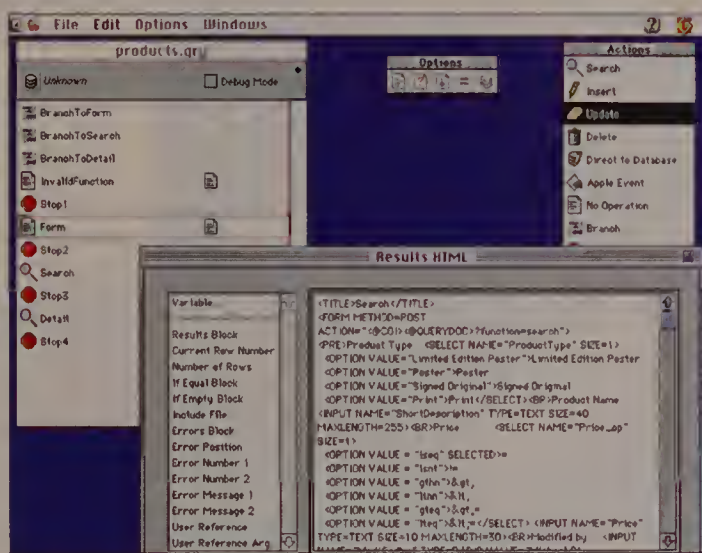
Tango for FileMaker does have a few problems: displays in Netscape Navigator and Microsoft Internet Explorer are sometimes odd, and there are anomalies in searching. To be fair, these are not usually EveryWare's fault: Netscape and Explorer change versions so fast that Java programmers can barely keep up, and some problems can be traced to poorly implemented features of FileMaker's relational design. EveryWare's indefatigable support team (E-mail support seems to go on around the clock) posts fixes to TangoTalk on the Tango Web site as soon as problems are discovered, but bear in mind, this cutting-edge software is still a work in progress.

When you're ready, you can upgrade from Tango's FileMaker version to the full SQL product, Tango, with a package that makes your FileMaker database readable by SQL queries. That's more-complex work for larger databases.

## The Last Word

The new FileMaker version of Tango will be a major factor in bolstering the Mac's position as *the* developer's tool for the Web. Put together in a hurry, it's not a perfect product, but by the wild-frontier, two-versions-a-month standards of World Wide Web software, it's really impressive.—CHARLES SEITER

**RATING:** ★★★★★/7.3 **PROS:** Excellent for rapid database connection to Web pages; great speed; great support. **CONS:** Slim documentation; good HTML knowledge required. **COMPANY:** EveryWare (905/819-1173, <http://www.everyware.com>). **LIST PRICE:** \$349.



**Blowup** Tango gives an excellent overview of Web-to-database interface logic by representing your programming effort as icon sequences. Icons expand to HTML with a simple double-click.

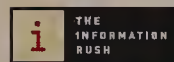
usually so quick that it's often easier to do the project from scratch again than to tinker with all the individual little Tango elements (a typical situation in icon-based programming).

Tango for FileMaker has an especially attractive feature: elements of the Tango "code" in icons correspond obviously and directly to familiar elements of your FileMaker database. Because FileMaker is quite simple compared with, say, Oracle or other SQL databases, this version of Tango is also much easier to use (and far less expensive) than its industrial-strength SQL cousin—it's a product for end users rather than Web consultants. For example, you can make a searchable Web site on which to post a modest FileMaker-based product catalog, with an order form, in your first day of practice with Tango for FileMaker Pro 3.0. The site will also operate much faster than sites based on AppleScript-based fix-



# Digital Science 8650 PS

SPEED, PRINT QUALITY HIGHLIGHT KODAK'S NEW DYE-SUB



DYE-SUBLIMATION PRINTERS can offer the best color print quality short of a photo lab, but they're generally not known for their speed. Kodak's new Digital Science 8650 PS yields striking, photographic-quality images at speeds among the fastest of all the dye-sublimation printers we've tested.

## Almost a Photograph

The 8650 PS's image quality is impressive, even compared with that of the dramatically more expensive 3M Rainbow and Radius Proof-Positive printers. When printing photos, the output came surprisingly close to the original scanned images, and illustrations had smooth gradients. Using Kodak's Photographic Grade paper, prints look and feel like glossy photographs.

For text output, the 8650's results aren't as impressive. Like most dye-sub printers in its class, its text quality is far below even personal laser printers'. The 8650 had problems with thin character strokes and tended to experience some voiding, or white gaps, within characters. If you mostly output text, consider a color laser or solid ink printer.

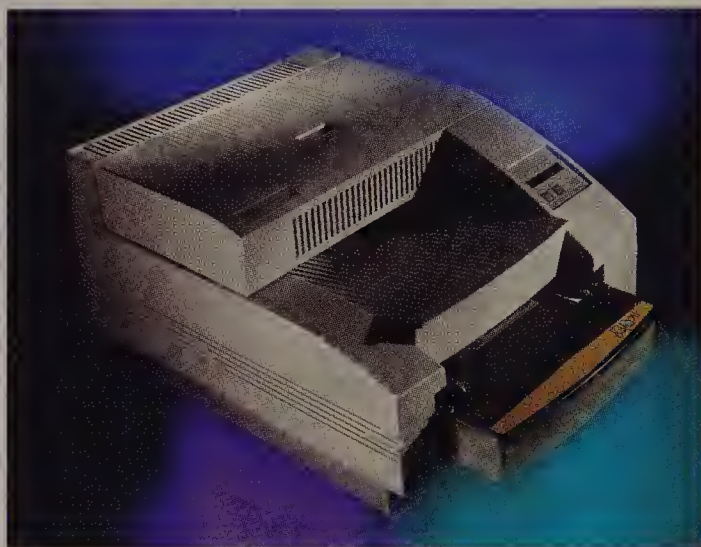
## Speedy, Too

In Macworld Lab tests, the 8650 was among the fastest printers in its class. In QuarkXPress tests, the 8650 was faster than any competing product in our last roundup, and on par with the top-ranking

systems in most other tests (see "Full-Proof Printers," *Macworld*, January 1996). The 8650's Photoshop export plug-in doesn't support CMYK files, but the 8650's speed using the print driver comes close to many other printers' speeds using an export-module plug-in.

## New Ribbons Make a Difference

The 8650 offers a larger print area than its older sibling, the Kodak XLS 8600, which is good news for its target audience in the



GIBSON

graphic arts community. You can fit four 4-by-6-inch prints within its maximum print area of 8½ by 12 inches; the 8600's maximum size was 8 by 10 inches. The ability to squeeze multiple images onto each sheet is a good thing, since your cost per page with a dye-sub printer is the same regardless of the amount of coverage. Kodak also offers a special-purpose ribbon that lays down a protective surface to resist fingerprints and light degra-

dation, and helps prevent the ink from transferring onto PVC sleeves in photo albums or wallets.

The Digital Science 8650 can print on a range of media, including transparencies. Besides Photographic Grade paper, Kodak offers two other special papers designed to simulate printed materials. Commercial Grade paper has a slight yellow tinge for more accurate proofs of projects printed on an offset press, and Publication Grade has a gray cast to simulate magazine stock.

For \$10,795, the 8650 model we tested includes full four-color support, 48MB of RAM, and PostScript Level 2 capability (the optional Ethernet card is \$995). If your color needs—or your budget—are more limited, Kodak also offers a three-color base model for \$8995 without PostScript support or Ethernet, and a \$9995 model with PostScript Level 2 language capability, a LocalTalk port, and 32MB of RAM. A one-year warranty is standard on all models.

## The Last Word

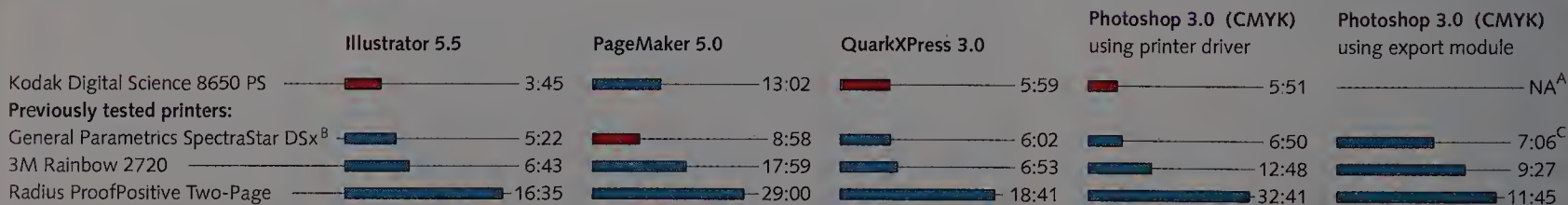
The Kodak Digital Science 8650 PS offers image-quality output rivaling that of proofing devices costing nearly twice as much, and speeds on par with the best of its class. It's not cheap, and you'll want to look elsewhere if text quality is a concern, but overall this printer is a solid contender.—BILL UNDERWOOD

**RATING:** ★★★★★/7.2 **PROS:** Excellent color reproduction; useful special ribbons and papers. **CONS:** Ethernet costs extra; text quality is poor; price is a bit high. **COMPANY:** Eastman Kodak (800/235-6325, <http://www.kodak.com>). **LIST PRICE:** \$10,795 as tested, plus \$995 for Ethernet.



## Kodak's Speedy New Dye-Sub

Best result in test. Shorter bars are better. Times are in minutes:seconds.



<sup>A</sup>Plug-in doesn't support CMYK mode. <sup>B</sup>300-dpi setting. <sup>C</sup>Printer set to raster mode.

### Behind Our Tests

All printers were tested at 300 dpi using EtherTalk, unless otherwise noted. (For detailed information on our tests and configurations of previously tested printers, see "Full-Proof Printers," *Macworld*, January 1996.)—Macworld Lab testing supervised by Mark Hurlow



# StuffIt Deluxe 4.0

SAME COMPRESSION FORMAT, BUT FASTER AND WITH A BRILLIANT FINDER TWIST

**F**IRST, THE GOOD NEWS ABOUT VERSION 4.0 of StuffIt Deluxe: the file format for compressed .sit files hasn't changed (always a dreaded possibility when compression software is updated). That's fortunate for denizens of the Internet and online services, where StuffIt is the predominant format for files that have been compressed to take up less space and download time.

Now, the great news: you'll probably never again need to use StuffIt Deluxe, the application. The new StuffIt Browser technology (which requires System 7.1.1 or later) is simplicity itself: instead of having to launch an application to see what's in an archive (a compressed bunch of files), you can double-click on an archive right in the Finder. Its window opens instantly, exactly as if it were an ordinary folder.

The metaphor is seamless: drag a file out of such an archive window, and it automatically expands; drag a file in, and it's stuffed before your eyes. To move compressed files, just drag them between open archive windows. Drop one archive atop another to combine the two. The archives-are-folders conceit is so smooth and obvious, it's hard to believe it took until 1996 for somebody to think of it; it's just too bad that you sacrifice 750K of RAM for the privilege. (Rival DiskDoubler, from Symantec, goes halfway—when you double-click on an archive, you launch a DiskDoubler application that *simulates* the Finder, but it's far from the real McCoy.)

## Online, on Target

The brilliance of the Browser feature easily makes it the most important aspect of the upgrade, but plenty of polish shows in other areas. For example, the Expand command in StuffIt's Finder menu can restore to usable form almost any kind of compressed file you're likely to encounter in your Internet explorations: StuffIt, Compact Pro, zip, arc, gzip, tar, Unix

Compress, uuencode, BinHex, and others. The Finder menu's new Stuff and Mail command should save modem freaks additional time; this single command compresses a file, launches your E-mail program (if you use Eudora, CE Software's QuickMail, or Microsoft Mail), and attaches your file to a newly created E-mail message.

As in previous versions of StuffIt, you're offered nearly countless ways to compress something. You can add a suffix such as .sit to its name. You can drop a file or folder onto an icon called DropStuff. You can use a QuickKeys macro. You can highlight a file or folder in the Finder and press ⌘-S. (Unfortunately, this method



**StuffIt Life Cycle** Highlight something in the Finder (left). Choose Stuff from the StuffIt menu (middle), or press ⌘-S. The best part: double-click on a resulting archive to see what's in it (right), then double-click on something inside to unstuff and open it.

makes the resulting compressed file jump annoyingly to a new desktop position.) As a bonus, version 4.0 is faster than previous versions, both with stuffing and unstuffing. My own tests show that StuffIt 4.0 at last matches the DD1 setting of DiskDoubler, the former speed champion—and compresses files smaller.

## SpaceSaver

StuffIt Deluxe 4.0, like the previous version, comes with the SpaceSaver control panel (also sold separately). This feature was originally designed to make file compression invisible, easy, and effortless: its primary function is to quietly compress almost everything on your hard drive when you're not actually using the Mac. When you double-click on a file, it is rapidly decompressed, and then automatically recompressed when you close the file.

But the automatic compression scheme was frustrating if you didn't fully understand what was happening. Therefore, today's SpaceSaver also lets you designate what files to compress based on such criteria as their age, label, file-name suffix, or home disk. Ironically, all this flexibility, two different compression algorithms, and numerous rules and routines make SpaceSaver one of StuffIt's most complicated components.

That minor problem hints at another irony of the StuffIt Deluxe package. Despite the program's ostensible purpose of saving space on your hard drive, a complete installation of StuffIt puts 70 different files onto the drive, consuming over 4300K of disk space.

## The Last Word

One category of upgraders is likely to be seriously unhappy with StuffIt Deluxe 4.0—those using a Power Macintosh 6100, 7100, or 8100 with System 7.5.3. Because of an obscure bug that Aladdin claims is Apple's fault, such Macs run into an unfortunate limitation: the program can't compress or expand any file larger than about 128K! If you try, the compression or expansion process stops halfway through; you're forced to dismiss two successive error messages. (Those affected will notice the problem using other StuffIt-savvy software, too, including America Online, Claris EMailer, and a number of installers.) As of this writing, Aladdin is working on a fix, but until it's ready, your choice is to abandon the upgrade to System 7.5.3, abandon StuffIt Deluxe 4.0, or abandon your Power Mac model.

For everyone else, though, StuffIt's beautifully implemented integration with the Finder makes upgrading from previous versions a no-brainer—and should provide the strongest temptation yet for users of the popular shareware version to consider paying for the whole commercial enchilada.—DAVID POGUE

**RATING:** ★★★★★/7.3 **PROS:** Impressive speed and compacting ability; archives work just like Finder folders; no change in file format. **CONS:** Doesn't work on some Macs running System 7.5.3; SpaceSaver component hard to learn. **COMPANY:** Aladdin Systems (408/761-6200, <http://www.aladdinsys.com>). **LIST PRICE:** \$129.95.



# LaserWriter 12/640 PS

SLOWER—BUT CHEAPER—THAN HP'S LASERJET 5M

**S**IMILAR FEATURES AND SLIGHTLY better print quality at a significantly lower price make Apple's new workgroup printer, the LaserWriter 12/640 PS, challenging competition for Hewlett-Packard's LaserJet 5M. However, HP is still the leader—by a wide margin—in terms of speed.

Like the LaserJet 5M (see *Reviews*, July 1996), the LaserWriter 12/640 PS offers a 12-pages-per-minute engine, 600-dpi resolution, and support for paper up to legal size. Unfortunately, you'll need a hefty RAM upgrade to print anything larger than letter-size sheets.

## How They Stack Up

The quality of the LaserWriter 12/640 PS's text output is on a par with the HP LaserJet 5M's. Neither printer shows any noticeable gapping, jaggedness, or fading of type. The LaserWriter handles illustrations—especially those with gray-scale gradients and fills—slightly better than the LaserJet, although its photographic images tended to print a bit on the dark side. Either printer, though, is a solid choice in terms of image quality.

Both printers are based on 12-ppm engines, but in Macworld Lab tests the LaserWriter proved significantly slower (see "Apple's Newest LaserWriter: Slow but Steady")—not entirely surprising, since the LaserJet 5M completed the standard test suite even faster than Apple's 16-ppm LaserWriter 16/600.

The unit we tested came configured with a hefty amount of RAM (24MB) and a price tag of \$1829. You'll need this much memory if you want to employ all of the

12/640's RAM-reliant features—FinePrint, PhotoGrade, duplex printing, legal-size imaging—but you can opt for a cheaper 12MB model if you only want either PhotoGrade or duplex printing.

Although the LaserJet 5M handles duplex and legal output in its standard 6MB configuration, you must install at least 24MB of RAM in the 12/640 for legal-size pages. (Luckily, you can buy SIMMs and install them yourself: in a rare fit of democracy, Apple has officially deemed the 12/640 "user-upgradable.") Purchasing extra RAM—especially at today's lower prices—is worthwhile: if you need to print double-sided documents, the RAM cost is more than offset by the lower price of Apple's duplex unit (\$399 compared with HP's \$649). For bare-bones buyers who need FinePrint but no other options, a \$1599 base model is available with 4MB of RAM.

## Paper Chase

If you print to a wide variety of media, the LaserWriter is a slightly better choice than the HP. Both models handle paper weights from 16 to 50 pounds and a variety of envelope sizes, but the LaserWriter adds postcards to the mix. Unlike the LaserJet's, the LaserWriter's Fuji-Xerox design has a straight-through paper path that helps prevent curling of heavy stocks and labels; you need an optional (\$49) output tray to use it, though.

Users in cross-platform environments will be pleased with the 12/640's support for various Windows systems, plus DOS and Unix, and its ability to connect to Novell NetWare networks using IPX and



KEVIN CANDLAND

TCP/IP protocols. Unfortunately, unlike the LaserJet 5M, which supports the newer PC-standard PCL 6 print language, the LaserWriter 12/640 PS lags behind with the older PCL 5.

The LaserWriter 12/640 PS is the first printer to ship with LaserWriter 8.4, the latest incarnation of Apple's printer driver. LaserWriter 8.4 offers single-pass printing—at last—and a host of usability and interface improvements that printer aficionados have been waiting for. (For more information, see *News*, in this issue.)

## The Last Word

If you need to squeeze the most out of your budget, the LaserWriter 12/640 PS offers great image quality and will save you hundreds of dollars over the HP LaserJet 5M. But if speed is a primary factor in your work, you may want to reevaluate your fiscal priorities.—ANITA EPLER

**RATING: ★★ ★/5.8** **PROS:** Good text and image quality; solid value; duplex and straight paper-path options; accepts a wide variety of media. **CONS:** Relatively slow; optional tray required for straight-through paper path; needs extra RAM for options. **COMPANY:** Apple Computer (408/996-1010, <http://www.apple.com>). **LIST PRICE:** Base model with 4MB of RAM \$1599; with 24MB of RAM (as tested) \$1829.



## Apple's Newest LaserWriter: Slow but Steady

Best result in test. Times are in seconds. Shorter bars are better. Products listed in order of overall performance.

	Illustration	Bitmap	Report	Memo	Spreadsheet	Newsletter
HP LaserJet 5M <sup>A,B</sup>	63	100	115	73	57	51
Apple LaserWriter 16/600 PS <sup>B,C</sup>	72	120	94	59	60	53
Apple LaserWriter 12/640 PS	53	239	140	66	59	128

<sup>A</sup>Previously tested, *Reviews*, July 1996 <sup>B</sup>Tested with LaserWriter 8.3 driver. <sup>C</sup>Previously tested in "Heavy-Duty Printers," June 1996.

## Behind Our Tests

Documents were sent via Ethernet from a Power Mac 7100/80 with 24MB of RAM. Times shown are for the fastest configuration. For detailed information on our test methodology, see "Heavy-Duty Printers," *Macworld*, June 1996. —Macworld Lab testing supervised by Lauren Black



# High-Performance Systems

POWERTOWER PRO, SUPERMAC S900L SIX-SLOT TOWERS SPEED PAST APPLE'S BEST

**T**HERE THEY GO AGAIN. JUST AS I'm getting used to the satisfyingly fast 180MHz systems that Power Computing launched in late April, they're already headed for the mainstream. Umax Computer is shipping a 180MHz system of its own, and Power Computing has released its fastest model ever, an all-new 225MHz Mac.

Power Computing's new 180MHz, 200MHz, and 225MHz PowerTower Pro systems are similar to the earlier PowerTower series, but with key differences: six PCI slots rather than three, 1MB of Level 2 cache instead of 512K, and a slower system bus that's required to take advantage of memory interleaving and faster cache implementation. The extra slots are a must-have for digital-video pros and multimedia authors, and while the larger cache may seem like overkill, the new 604e CPU needs it for optimal performance. For most people, the lower bus speed isn't an issue, since the extra cache and memory interleaving make up for it.

The PowerTower Pros are a bit easier to upgrade than the PowerTower models, but it's still more work than I would like. As in the past, Power Computing includes solid peripherals: a fast IMS TwinTurbo video card with 8MB of VRAM, a 2GB AV-capable hard drive, and an 8x CD-ROM drive. Eight expansion bays (six external and two internal) round out its offerings.

The PowerTower Pros are compelling alternatives to Apple's Power

Macintosh 9500, but they have tough competition in the SuperMac S900L, a six-slot tower from Umax Computer. The 150MHz version reviewed here isn't your best bet if you need ultimate speed—although a 200MHz version slated for August release may fit the bill—but its design is comparable to that of the PowerTower Pro line, offering eight DIMM slots, six PCI slots, and an upgradable CPU and cache.



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Unfortunately, the S900L has a slower CD-ROM drive (6x rather than 8x), fewer expansion bays (six, not eight), and less VRAM (4MB as opposed to 8MB) on its bundled TwinTurbo video card than the PowerTower Pros do.

On the upside, the S900L offers a proprietary slot for a second CPU card—which Umax says should cost about \$1000 when it ships—but that card has been delayed several months because of engineering problems.

## The Last Word

Based on price, the PowerTower Pro series and the S900L get the nod over a Power Mac 9500. The PowerTower Pros are, as a group, the fastest systems that you can buy, but that's a fleeting advantage—especially when you consider that you can expect Apple and Umax to have similar offerings by the time the 225MHz PowerTower Pro is available in large quantities.—GALEN GRUMAN

## PowerTower Pro Series

POWERTOWER PRO 225 ★★★★★/7.9

POWERTOWER PRO 200 ★★★★★/7.7

POWERTOWER PRO 180 ★★★★★/7.6

**PROS:** High performance; good price; good set of peripherals. **CONS:** Case makes upgrading a bit difficult. **COMPANY:** Power Computing (512/338-6886, <http://www.powercc.com>). **DIRECT PRICE:** Pro 225 \$4995; Pro 200 \$4495; Pro 180 \$4195 (all with 16MB of RAM, 2GB hard drive, 1MB cache, and 8MB of VRAM).

## SuperMac S900L

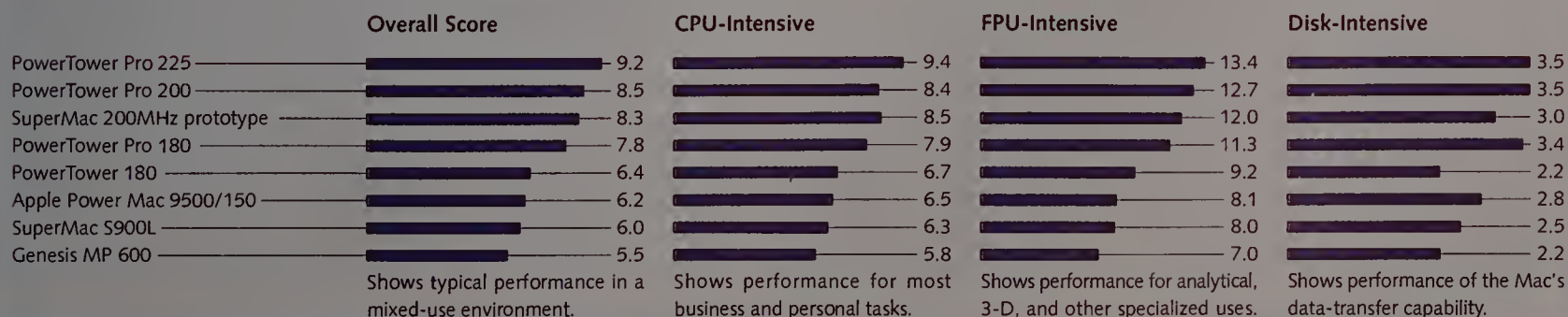
**RATING:** ★★/6.8 **PROS:** Good price. **CONS:** Middling performance. **COMPANY:** Umax Computer (510/226-6886, <http://www.supermac.com>). **LIST PRICE:** \$3995 (16MB of RAM, 2GB hard drive, 512K cache, and 4MB of VRAM).



## Faster and Faster: The Latest Macs Up the Ante (Again)

The new 604e-based PowerTower Pros scream, thanks to their fast CPUs and large Level 2 cache. The Umax SuperMac S900's 150MHz system already feels dated, but a 200MHz version will ship soon.—Macworld Lab testing supervised by Mark Hurlow and Chris Uiterwijk

Products listed in decreasing order of overall performance. Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0).





# Stylist 1.0

PLUG-IN PICKS UP WHERE ILLUSTRATOR LEAVES OFF

ONE OF MACROMEDIA FREEHAND 5.5's advantages over Adobe Illustrator 6.0 is that it offers an extensive system of style sheets, while Illustrator forces you to apply attributes manually and modify objects individually. If you use Illustrator 6.0, you need envy FreeHand users no more: Alien Skin's Stylist plug-in picks up where Illustrator leaves off, letting you combine progressive sets of fill and stroke attributes without laborious cloning and tweaking. It's a heck of a productivity tool, and it's the first Illustrator plug-in to take advantage of version 6.0's new API.

## Style Control

After you install Stylist in Illustrator's Plug-ins folder, the program manifests itself as a floating palette with its own labyrinth of options, menus, and preferences. You can define styles that govern fill and stroke characteristics and—for text—character- and paragraph-level formatting attributes. Stylist imposes its own methods for specifying attributes, many of which are more convenient than Illustrator's. If you're more comfortable with the old ways, you can establish settings in Illustrator's own Paint Style, Character, and Paragraph palettes, then transfer them to the Stylist palette.

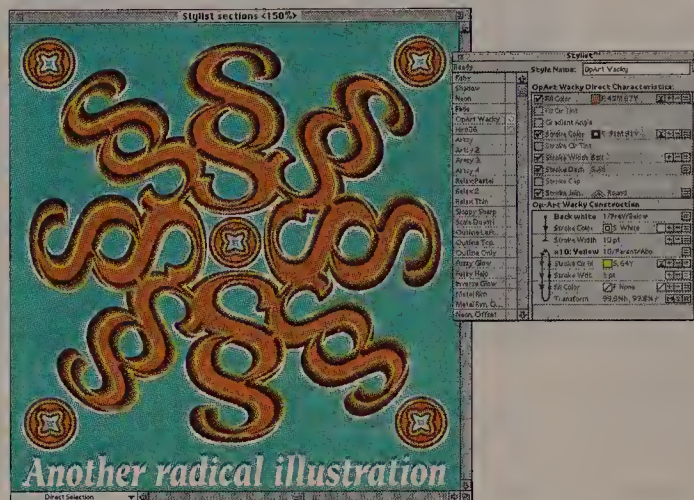
No other program gives you such selective control over style sheets. Stylist lets you turn on the precise attributes you want a style to affect; for example, a style may govern the line weight of several objects while letting you assign a different color and dash pattern to each stroke. You can even assign multiple styles to an object, with each style affecting different sets of attributes. If two styles conflict—say, one calls for a blue fill and the other calls for orange—the order in which they appear in the palette determines their precedence. To change the order, you simply drag the style names.

Stylist is first and foremost an organizational tool, so it makes sense that it lets you edit stylistically similar objects simultaneously. When you modify a style, all paths and text blocks linked to that style are updated. You can also select,

lock, and hide all objects linked to a style. And if you have several paths with identical fills and strokes, you can double-click on a path with Illustrator's eyedropper tool, convert the attributes into a style inside the Stylist palette, instruct Stylist to select all paths that share those attributes, and attach the style sheet. From then on, you can control the attributes globally.

## Construction Workers

All the functions I've mentioned so far are highly practical, but the features most likely to seduce and inspire are Stylist's



**Stylistic Serpentine** Here I've created a style that clones, rotates, and slightly scales my artwork while applying increasingly thinner and lighter strokes. The result is a pronounced contour effect.

*constructions.* A construction is a script that clones a path a specified number of times and incrementally adjusts the clones' fills and strokes to create a gradual blend. For example, you can create a neon effect by repeating strokes with increasingly lighter colors and thinner line weights. Constructions also lend themselves to drop shadows and contour effects. While you can achieve effects like these without Stylist, you end up with tens or even hundreds of overlapping paths, making editing a nightmare. In addition to changing fill and stroke attributes, you can transform clones by moving, scaling, and rotating them incrementally (see "Stylistic Serpentine"). By giving you the freedom to adjust and modify a construction at will, Stylist encourages you to try out effects you wouldn't otherwise attempt.

Although a construction consists of

multiple paths, it appears as a single path. That means you can manipulate points and control handles, or transform or filter the path and let Stylist worry about updating the clones. Unfortunately, Illustrator 6.0's new API doesn't account for such a high level of automation; every time you edit a path with a construction style applied to it, Stylist has to recalculate the clones. Rather than ignore this automatic operation, Illustrator appends it to the Undo list. So if you move a path and then think better of it, you have to undo both the automatic construction update and the move.

Although Stylist's palette is fairly straightforward, creating constructions is roughly as difficult as basic scripting, and the skimpy documentation isn't particularly insightful. However, you can choose from 103 predefined styles and dissect them to see how they work. Be aware that complex constructions take a few seconds to redraw on screen, and Stylist occasionally neglects to update a construction. Long-time Illustrator users may be mystified that styles aren't shared between all open illustrations, but you can easily copy styles from one file and paste them into another.

## The Last Word

Some artists will doubtless have problems grasping Stylist's benefits, while others will find constructions too complicated to bother with. But if you're willing to spend a little time with the program, you'll gain more control over your text and graphics and be better prepared to make last-minute changes to suit your clients' whims. Best of all, you'll be dreaming up layered path effects that are currently too convoluted to attempt in Illustrator.—DEKE MCCLELLAND

**RATING:** ★★★★★/8.2 **PROS:** Gives you unprecedented control over fill, stroke, and text-formatting attributes; lets you select, lock, and hide objects by style; complex cloning effects are easy to create. **CONS:** Automatic updates use up an Undo level; styles aren't shared between open illustrations. **COMPANY:** Alien Skin Software (919/832-4124, <http://www.alienskin.com/alienskin>). **LIST PRICE:** \$199.



# Nobody Out-Trons SonicTron.<sup>TM</sup> Not even Trinitron.



Today, the market is full of Trinitron®-like technologies. And while most companies are satisfied with simply cloning it, ViewSonic® has improved it.

SonicTron™, ViewSonic's newest color screen technology gives even the most demanding Macintosh® owners, desktop publishers and graphics users vivid, saturated colors and high contrast images so intense they're staring in wide-eyed amazement.

## The experts agree.

SonicTron has been getting some pretty impressive reviews. Says Jerry Pournelle in *Byte* magazine, "The User's Choice Award for this year goes to the ViewSonic Professional Series PT810."

*MacUser* gave it a 4-mice rating and added, "It boasts image quality so good even demanding graphics artists and desktop publishers will be pleased."

*Computer Reseller News* gave the SonicTron PT770 their Editor's Choice award in April, 1996.

## The price is right.

Both ViewSonic's PT810 and PT770 SonicTron monitors deliver astonishing clarity—and pricing the other Trons can't get close to.

Ranging from 17" to 21" (15.9" to 20.0" viewable), SonicTron has an aperture grille mask for sharp focus and brilliant color, OnView® controls for easy screen adjustments and Colorific™ software to insure that printer and monitor color profiles match perfectly.

A limited 3 year warranty on CRT, parts and labor, and an optional Express Exchange™ Service program that insures 48 hour replacements are also part of the deal. If you'd like to see the Tron that all the others look up to, call your reseller.

Or, for more information, call  
(800) 888-8583 ask for agent 5866.



## ViewSonic®

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Model	ViewSonic PT810	Sony 20sfil	ViewSonic PT770	Sony 17sfil
Aperture Grille Pitch	0.30mm	0.30mm	0.25mm	0.25mm
CRT Size	21"	20"	17"	17"
Viewable	20.0"	19.1"	16.0"	16.0"
Horizontal Scan Rate	30-96 KHz	30-85 KHz	24-82 KHz	30-65 KHz
Maximum MAC® Resolution	1600x1200	1280x1024	1280x1024	1024x768
Color Control	Yes	Yes	Yes	No
CRT Warranty	3 Years	2 Years	3 Years	2 Years
MSRP*	\$1,895	\$2,299	\$895	\$1,099

\* MSRP as of August 1, 1996. Prices and specifications subject to change without notice.

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Source Code: VWS596



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# Faxstf 3.2

## FAX PACKAGE SUFFERS FROM ITS REVISION

**T**HE LATEST VERSION OF FAXSTF includes some big changes. Want better performance? OK. How about new enhancements? You got it. How about *fewer* features? You got that, too. Unfortunately, this sort of confusion doesn't stop with the feature set—it extends to the program's operation and its user interface. Many of the changes from previous versions aren't true improvements.

Faxstf 3.2.1 did a creditable job of sending and receiving faxes on my systems, which include a Power Computing Power 100 and an Apple PowerBook 190cs. As a longtime Faxstf user, I had no problems performing my typical tasks, including receiving multiple-page faxes and sending short faxes with a Supra-FaxModem 288. Unfortunately, the program's new, more modern look took some getting used to, as did the many extras STF has thrown in.

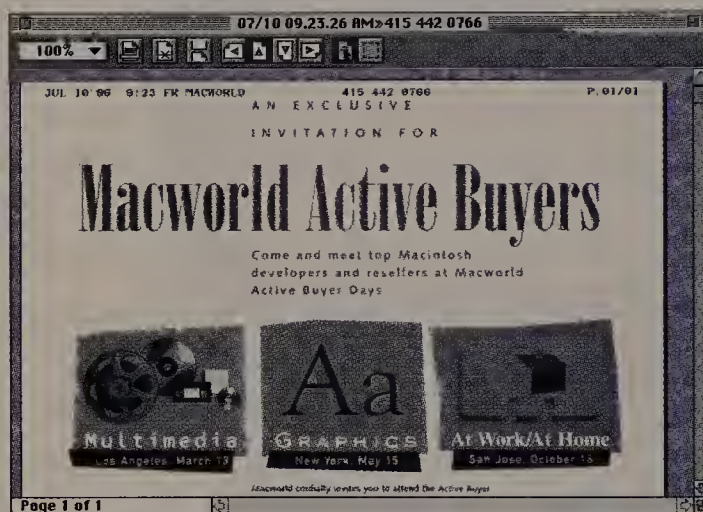
### Interface Attack

Faxstf 3.2's user interface seems not so much to have been designed as to have grown out of control, like kudzu. With five independent yet similar faxing methods, it's as though Faxstf's programmers never met a feature they didn't like. There are three main components: the FaxMenu control panel, which places a hierarchical menu in the Apple menu or your menu bar; FaxBar, an application with a bar of control buttons that floats over all other applications; and FaxModule, a plug-in component for Apple's Control Strip. Incredibly, all three of these pieces do exactly the same thing, providing identical controls for various fax functions. They're all installed by default, though I suggest you pick your favorite and prune the others. You can also send a fax by dragging a file onto the DesktopFax icon, or by the usual method of printing to the driver in the Chooser.

There are other changes in the package, though none are for the better. In previous versions, STF Manager would

display incoming faxes when you double-clicked on a fax's listing in the In Box. Now, however, the same action launches the new FaxView application. Although this program does a much better job of displaying the fax—including gray-scale images and antialiased text—it's not clear why this functionality wasn't simply built into STF Manager, instead of requiring the extra RAM and disk overhead of a separate program.

In the same vein, you used to be able to export a single page of a fax from within STF Manager as a PICT or TIFF file. In version 3.2, the Export command is dimmed, and you have to use a separate



**Fax and Figures** Faxstf's new FaxView application does a great job of smoothing images and text to make your fax look good. Too bad it's a separate program that sucks up more than 2MB of RAM, on top of the 1MB required for STF Manager.

utility, FaxExchange, to convert faxes to another file type. Annoyingly, FaxExchange won't let you choose just one page to export; you have to convert the whole fax, which isn't any fun when you want only one page from a 40-page document.

Faxstf includes AutoOCR for automatic fax-to-text translation, and AutoPrint, which sends faxes directly to your printer as they're received. The OCR engine, licensed from Calera, does an acceptable job with clear faxes.

If your colleagues need fax capabilities, Faxstf can work in multiuser environments. I reviewed the single-user program, but STF also sells a network version that lets many users share a single fax modem; the fax server and five-user pack sells for just over \$700.

### Bug Patrol

Unfortunately, version 3.2.1 maintains Faxstf's reputation as one of the quirkiest software packages on the market, with many camps reporting bugs and problems. The virtual screams of maddened users on STF's support forums on major online services are painful to read. To be fair, ensuring compatibility with more than 300 modem models and thousands of software packages is a daunting task, and STF has been suitably responsive, assigning several technicians to answer disgruntled users' E-mails. At press time, STF posted an updater to version 3.2.1 that fixed compatibility problems with a long list of programs, including Microsoft Word and Excel, Adobe PageMill and Illustrator, Now Utilities, Symantec ACT, Claris FileMaker Pro, and other major applications.

Still, the fact that so many widely used programs had compatibility issues with a release version of the product doesn't speak well for STF's quality-assurance testing procedures. Owners of PCI-based Power Macs running System 7.5.3 seem to be having the biggest problems. I also encountered numerous reports of hardware incompatibilities with several common modem models, including some from major hardware vendors like US Robotics and Hayes.

### The Last Word

Compared with previous versions, Faxstf 3.2 seems to have lost focus. Many of its "improvements" are ill-conceived and poorly implemented. Still, if your faxing needs are basic—limited to sending and receiving faxes—Faxstf does an admirable job. You should be prepared to check it out thoroughly for compatibility with your hardware setup and the programs you regularly use, and make sure you buy it from a vendor who offers a money-back guarantee, in case the program doesn't work for your particular configuration.—TOM NEGRINO

**RATING:** ★★/3.9 **PROS:** Sends and receives faxes well; improved display capabilities. **CONS:** Bugs and conflicts with numerous applications and modems; interface and features have suffered in this upgrade; poorly designed export function. **COMPANY:** STF Technologies (816/463-1142). **LIST PRICE:** Single-user version \$99; five-user/fax server version \$719.95.



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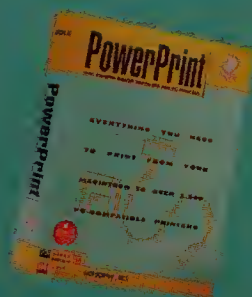
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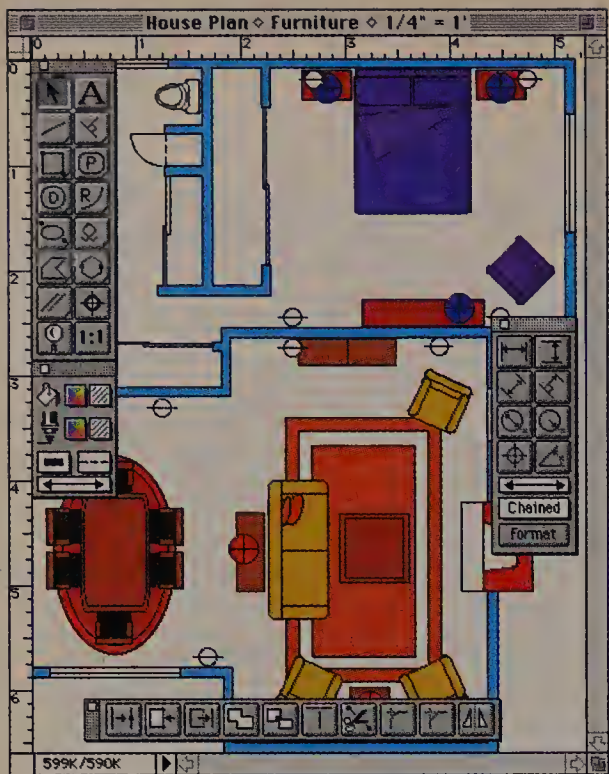
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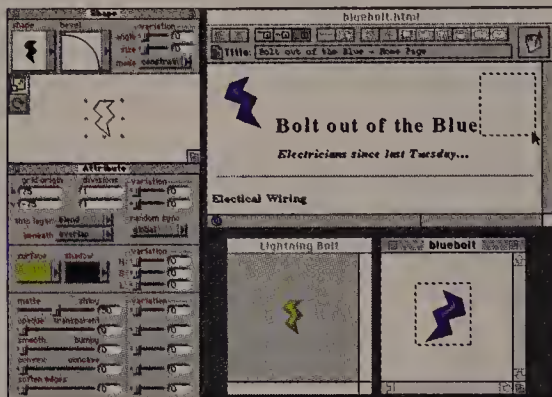
## Reviews

# 3D Web Workshop

INSTANT INTERNET PRESENCE IN 3-D

**i** THE INFORMATION RUSH Specular International has joined the Web marketing frenzy with 3D Web Workshop, a layout and design suite for creating Web pages. While 3D Web Workshop isn't particularly innovative—it consists largely of existing Specular products, loosely integrated and bundled with Adobe PageMill—it does give you all the tools you need to create a Web site and embellish it with graphics and animation effects.

The suite consists of Specular's TextureScape and LogoMotion, both updated to version 2.0.2 for this package; Adobe PageMill 1.0 (see *Reviews*, March



**Hands On** Using TextureScape, you can easily alter any WebHands graphic element and drag it onto a PageMill document.

1996) for WYSIWYG Web authoring; a collection of clip-art Web graphics; and Web-related utilities such as GifBuilder, a freeware application that converts QuickTime movies into animated GIFs.

The only brand-new part of the package is WebHands, a collection of more than 1500 graphic elements rendered as GIFs. You can view the bullets, buttons, rules, and textures using your Web browser; to incorporate an image into your Web page, you simply drag it from the browser window into an open PageMill document. Some of the graphics are rather anemic, but many—the buttons and artistic bullets, for example—are truly useful.

You can easily edit any WebHands graphic element from within TextureScape, a collection of simple but powerful tools for editing and creating graphic objects and textures. Objects are made up of layered graphic shapes; each layer has its own color, lighting, and surface attributes. Using simple pop-up menus and slider bars, I easily adapted a series of buttons to fit the look-and-feel of my com-

pany's corporate identity. You can create objects using a library of predefined shapes or by importing EPS graphics from Adobe Illustrator or Macromedia FreeHand; you can also create regular or random textures and apply them to the background of your Web page or to other graphics (see "Hands On"). TextureScape even offers a simple, event-driven animation feature for creating morphing effects.

Another existing Specular program, LogoMotion, offers tools for creating and animating 3-D objects, particularly text and logos. Its interface is unique and relatively intuitive: to apply a surface, lighting, or animation effect, you simply drag it onto the object you're working with. A number of predefined effects are included to get you going, though you may not feel productive with LogoMotion as quickly as with TextureScape; I struggled a bit at first getting the shading, lighting, and orientation of my models just right. Once I got the hang of them, LogoMotion's tools helped me create a cool 3-D version of my company logo.

While the individual components are effective, 3D Web Workshop is hardly an integrated environment. For example, both TextureScape and LogoMotion let you drag and drop graphics into PageMill; unfortunately, you end up selecting unwanted background along with the graphic. Neither application can create animated GIFs—you have to save an animation as a QuickTime movie, use an included utility to convert it to an animated GIF, then manually place the GIF in PageMill. And although the documentation is clear and user-friendly, it lacks such Web-related information as how to optimize graphics or create a dynamic site.

### The Last Word

3D Web Workshop is more marketing effort than breakthrough product; still, it's a useful and usable set of tools for creating attractive graphics and animations for the Web. It's an excellent value, and it would be a nice addition to any Web designer's tool kit.—J.W. DAVIS

**RATING:** ★★★★★/7.1 **PROS:** Strong, editable graphic elements; good value. **CONS:** Components aren't well integrated; some weak content areas. **COMPANY:** Specular International (413/253-3100, <http://www.specular.com>). **LIST PRICE:** \$249.



## COMPARE

This Encapsulated PostScript (EPS) image was printed on a color inkjet printer **without** StyleScript

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# Tumbleweed Publishing Essentials

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PORTABLE DOCUMENTS have become more popular in recent years, thanks in part to the World Wide Web: because these files can be distributed to different platforms without losing their original look and feel, they're considered a superior alternative to HTML. The Adobe Acrobat and Novell Envoy formats are the main contenders in the portable-document arena; both support the Macintosh and Windows, but Acrobat supports some flavors of Unix as well. Now, Tumbleweed Software, which created Envoy and licensed it to Novell, has come out with a program for creating and distributing Envoy documents via CD-ROM, floppy disk, or the Internet. With Tumbleweed Publishing Essentials (TPE), Envoy documents are faster and cheaper to create than Acrobat documents.

TPE's core components are a print driver and a viewer. Creating an Envoy document is as simple as switching to the Envoy driver in the Chooser and selecting Print from any application's File menu. You have the option of embedding a run-time viewer in the document; that adds 1.1MB to the file's size, but ensures that any Macintosh user can display the document. The Envoy Viewer lets the user annotate Envoy documents with sticky notes, bookmarks, and highlighting; view pages at different magnifications; display thumbnails of the pages; and access hyperlinks, either to other parts of the document or to Web sites.

TPE includes Tumbleweed Publisher for converting Adobe PostScript, EPS, and Acrobat files (or any printable file) into Envoy format. The Index Builder can't match Acrobat's indexing tool, but creating hyperlinks with the Link Builder is easier than in Acrobat, and the Outline Builder is unrivaled.

Tumbleweed claims that Envoy has several advantages over Acrobat, including lower RAM requirements, smaller file size, faster printing, and improved quality. Tests showed some of these claims to be true. The Envoy Viewer requires 2.5MB of RAM versus 3.5MB for the Acrobat Reader. Envoy documents also

take much less time to create than Acrobat files; my 150-page Microsoft Word 5.1 test file took about 1 minute to create with Envoy but more than 13 minutes with Acrobat.

Tests showed Envoy documents to be smaller than their Acrobat counterparts in some cases, but not in others (see "A Way with Text"). Envoy documents that contained text or line art were often significantly smaller than similar Acrobat files. When the files contained PICT files, however, the resulting Envoy documents were sometimes larger than the original files, and JPEGs in Envoy were of consistently inferior quality. Acrobat was better at displaying 24-bit graphics and rasterizing EPS files. I also experienced an odd bug with the Envoy driver: when I print-

File Type	Original File	Acrobat File	Envoy File
Word 5.1 file	251K	280K	151K
EPS (line art)	152K	39K	20K
EPS (with fills)	314K	77K	119K
JPEG (photograph)	25K	79K	24K
PICT (drawing)	113K	87K	213K

**A Way with Text** TPE shines with text files and some kinds of line art. Its Achilles' heel: PICT files and illustrations with fills.

ed from a draw program, the resulting Envoy document contained the original drawing's graphics but none of the text. Tumbleweed tech support had no explanation for the odd behavior.

### The Last Word

TPE can't match Acrobat for high-quality graphics, but it's more than acceptable for most business users. Indexing, hyperlinking, and outlining tools, which come standard with TPE, are add-ons with Acrobat. When you consider that the comparable Adobe package, Acrobat for Workgroups, lists for more than twice as much, TPE looks better and better.—TOM NEGRINO

**RATING:** ★★★★★/7.4 **PROS:** Faster, less expensive, and less RAM-hungry than Acrobat. **CONS:** Inferior rendering of JPEG files. **COMPANY:** Tumbleweed Software (415/363-7022, <http://www.twcorp.com>). **LIST PRICE:** \$695.



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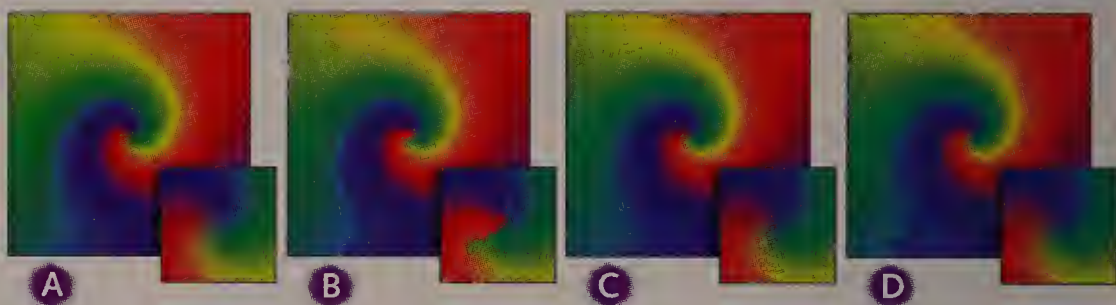
## Reviews

# HVS Color 1.2

PLUG-IN KEEPS WEB GRAPHICS SMALL,  
COLORS TRUE



WITH WEB SERVERS PUSHED to their limits and most of us using relatively slow modems to log on, large graphics can be as annoying as they are attractive. Enter Digital Frontiers' HVS Color, a plug-in devoted to reducing the file size of GIF images. Available in separate versions for Adobe Photoshop and Equilibrium's DeBabelizer, HVS Color 1.2.4 jettisons colors and saves precious kilobytes of space with minimal loss of image quality. It's not a miracle cure, but it wrings out colors more satisfactorily than any other tool I've seen.



**Removing Colors from the Rainbow** Using HVS Color, I reduced this 733K RGB swirl (A) to a 6-bit 32K GIF image suitable for the Web (B). Also shown are color reductions done in Photoshop—a 50K dithered image (C) and a 17K image without dithering (D). Image B isn't the smallest, but arguably it delivers the best compromise between size and quality.

Most folks rely on their favorite image editors to prepare GIF graphics, but those programs aren't quite up to the job. When converting 24-bit images to 256 or fewer colors, they keep the most common colors and toss the others. While some programs make allowances for rogue hues—a bright red flower in a sea of green grass, for example, will remain at least partly intact—they don't consider how the remaining colors will look positioned next to each other. The result: harsh transitions and a few odd-colored specks.

Rather than slavishly measuring color frequency, HVS Color evaluates the way colors interact and lets you emphasize transitions or minorities. You can expand the middle color range by clipping extreme lights and darks and highly saturated hues. When working on a calibrated monitor, you can even adjust gamma values to make sure an image looks the same on other screens as it does on yours.

No other program—not even DeBabelizer—delivers such prepress-like control over Web color management.

Surprisingly, HVS Color makes no attempt to jumble different-colored pixels, a technique known as dithering. Random diffusion dithering can smooth out harsh transitions, though it makes for larger file sizes. While I appreciate HVS Color's attempt to keep file sizes down, sometimes you simply can't avoid banding without resorting to dithering no matter how carefully the software selects colors. I'd like to be able to turn dithering on and off at my own discretion.

HVS Color could stand a few other improvements. In DeBabelizer, the plug-in runs a color-space conversion and displays the results on screen, as you would

expect. Photoshop doesn't allow plug-ins to invoke color-space conversions, so HVS Color saves the stripped-down image to disk. To avoid GIF licensing fees, the plug-in exports to the PICT format, requiring you to open the image and save it as a GIF. Also, you have to specify color depths in numbers of colors (128 for 7-bit, 64 for 6-bit, and so on). Since intermediate values save no room on disk—a 129-color image is the same size as a 256-color one—color-depth options would be more appropriate for new and intermediate users. Finally, the only documentation is a text file on disk.

### The Last Word

Shortcomings aside, no other program gives you this much control over generating adaptive indexed palettes. That strength alone makes HVS Color an essential tool for Web artists and photographers.—DEKE MCCLELLAND

**RATING:** ★★/6.8 **PROS:** Retains color transitions; prepress-like color management; results in small files. **CONS:** Doesn't allow dithering; lacks GIF support; no printed documentation. **COMPANY:** Digital Frontiers (847/328-0880, <http://www.digfrontiers.com>). **LIST PRICE:** \$99.



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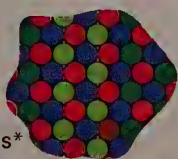
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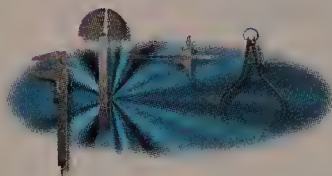
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# form-Z RenderZone 2.8

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**C**OMPLEXITY IS OFTEN CONFUSED with difficulty: if a program is complex, we reason, it must be hard to use. But complexity sometimes creates an efficiency that, coupled with experience, makes software easier to use. So it is with form-Z, an outstanding 3-D modeling program. Combined with RenderZone's first-class, photorealistic rendering tools, this is one of the best—if one of the most expensive—modeling and rendering packages anywhere (form-Z is also available without RenderZone).

form-Z RenderZone 2.8's modeling features alone justify the price. While most 3-D programs are surface modelers—they build objects that are essentially empty, like a balloon—form-Z is a solids modeler; the objects it produces have volume, like a brick. Solids modelers let you ascribe the mass properties of materials to object volumes and explore a model's physical characteristics; for example, you can determine the final weight of a machined part. Unlike modelers that apply Boolean functions by measuring and trimming object surfaces, solids modelers calculate the interaction of volumes.

form-Z has tools for lathing, extruding, and sweeping objects, along with special-purpose tools for building walls, terrain objects, and complex spherical solids. The program also produces solid and surface mesh objects using various spline types. All form-Z objects are editable down to individual surface faces, edges, and vertices, offering exceptional shape-contouring versatility. A full-featured,

integrated drafting component lets you specify construction or manufacturing drawings directly from a 3-D model. You could also begin with a 2-D drawing, as an architect might with a floor plan.

To deal with this multiplicity of tools, form-Z uses a customizable 14-row palette. Unobtrusive floating palettes let you manage objects, lights, layers, views, and symbol libraries. Tool organization follows its own logic—not necessarily Mac conventions—and simple operations sometimes appear needlessly complicated. In general, though, form-Z's interface is clear and well designed.

The form-Z RenderZone package gives you several rendering options—Gouraud, Phong, z-buffer, and ray tracing—and excellent texturing controls for adjusting surface attributes. In addition to procedural textures, you get an assortment of image textures, including trees for planting around architectural models. The preview options could be better, and it would be nice to be able to suspend and

resume rendering, but overall RenderZone is a wonderful addition to form-Z.

The documentation is comprehensive, clearly written, and well organized, but you'll log some time poring over it.

## The Last Word

With tools for every conceivable object-creation function, form-Z is undeniably complex. But if you take the time to learn its intricacies, you can build virtually anything with minimal effort. And with RenderZone you won't have to go elsewhere for photorealistic renderings. An above-average price and steep learning curve (not to mention an annoying hardware-key protection scheme) may deter some, but professional designers looking for sheer modeling power won't be disappointed.—CARLOS DOMINGO MARTINEZ

**RATING:** ★★★★★/7.5 **PROS:** Exceptional 3-D modeling tools; excellent rendering; integrated 2-D drafting. **CONS:** Steep learning curve; hardware key; expensive. **COMPANY:** autodessys (614/488-9777, <http://www.formz.com>). **LIST PRICE:** \$1995; without RenderZone, \$1495.



**Shedding a Little Light** form-Z offers excellent object-building tools that let you build models with complicated, compound-curved shapes. And RenderZone's wonderful rendering controls now let you shed some light on the subject.

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# HSM ToolKit

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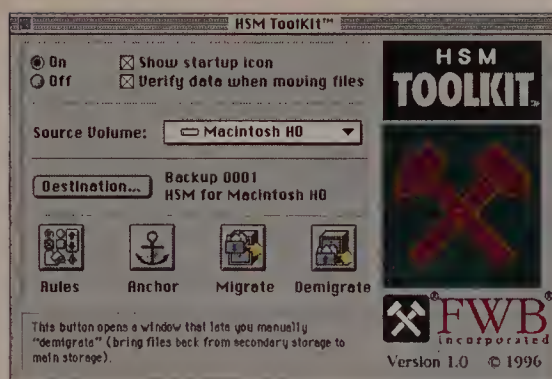
**D**OES YOUR HARD DRIVE SEEM TO fill up faster than Yankee Stadium on Bat Day? If so, then you know that burgeoning files are more than just a minor inconvenience. Even when you think that you have megabytes of free storage, an application like Adobe Photoshop may choke because there isn't enough room on the disk to store temporary files.

FWB's HSM ToolKit (HSM stands for Hierarchical Storage Management) unclogs congested hard drives by identifying little-used files and moving them to alternate media such as a networked disk, auxiliary drive, removable cartridge, optical disk, or backup tape. This handy utility wipes noncritical files from your drive, leaving behind an alias that invokes the nomadic application or data file when you need it. Your slimmer, trimmer hard drive then has plenty of room for essential files or for use as fast virtual memory.

If you want to set up a utility to keep your disk neat and tidy and then forget about it, HSM ToolKit is a dream come true. It's easy to set up, and it works transparently once you've got it configured. Of course, you can perform some of HSM ToolKit's functions manually, using the alias feature in System 7.0 or later: just transport a file to a removable disk, create an alias, and deposit the alias back on your hard drive. But FWB's utility takes the work out of deciding which files to move (or move back); running in the background, it constantly monitors your hard disk to keep it from filling up.

The heart of HSM ToolKit is the HSM Engine. Unlike the Mac's system software, which only records the time and date a file is created or modified, this extension keeps track of every *access*—even when you read a file without making changes, for example—and it's smart enough to ignore access by common programs such as Norton Disk Doctor. The HSM Engine decides which files have been idle long enough to merit removal to an alternate storage device; it also decides which previously migrated files are being accessed frequently and should be restored to your hard disk.

One of the program's most powerful features is that you can tell it to leave cer-



**Cleaning House** HSM ToolKit asks you to specify the monitored volume and the destination, which may be another hard disk, a removable disk, an optical disc, or a backup tape.

tain files or folders alone. HSM ToolKit can then aggressively clean up a frequently cluttered machine—say, a Mac that's shared by many users in a lab or classroom—while leaving anchored programs and files intact.

You can set up the rules for migrating files to or from secondary storage—for example, you can tell HSM ToolKit to start moving files any time the hard disk fills up to 85 percent capacity, or to go to work when your computer is idle. (You can also select and migrate files manually.) The rules may seem complicated, but

HSM ToolKit makes them easy to set up. However, because you can specify only one source drive and one destination at a time, HSM ToolKit can protect just one of your hard disks. The solution, of course, is to keep your application files on one drive, which remains fairly static, and your data files on a second drive monitored by HSM ToolKit.

## The Last Word

If all you want to do is transfer a few files to a SyQuest or Zip cartridge and access them through an alias, this utility is overkill. But if your work involves projects that can quickly consume large chunks of online storage, HSM ToolKit offers a transparent way to keep your hard disk lean and mean.—DAVID D. BUSCH

**RATING:** ★★★★★/8.5 **PROS:** Moves files off and on your hard disk using rules you define; works while computer is idle; optional compression. **CONS:** Can monitor only one hard disk volume and migrate files to only one destination at a time. **COMPANY:** FWB (415/325-4392, <http://www.fwb.com>). **LIST PRICE:** \$79.

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## SEAMLESS INTEGRATION.



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# Conflict Catcher<sup>3</sup>

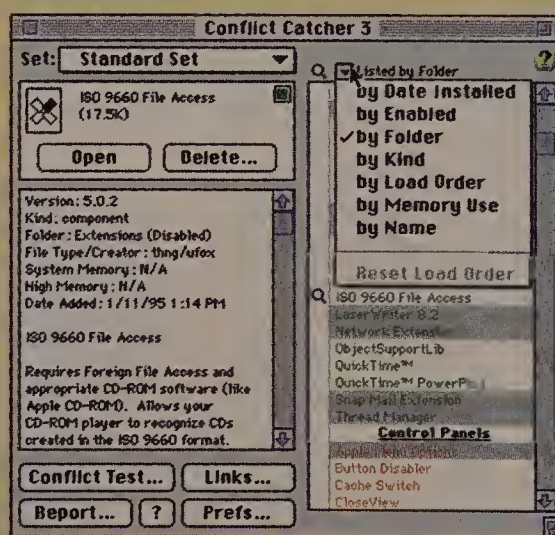
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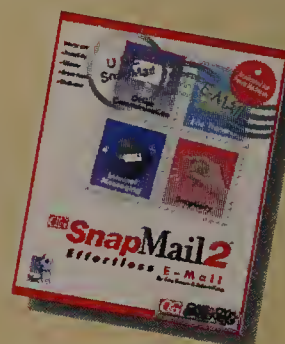
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# LAN Commander

NETWORK MANAGEMENT MADE SIMPLE

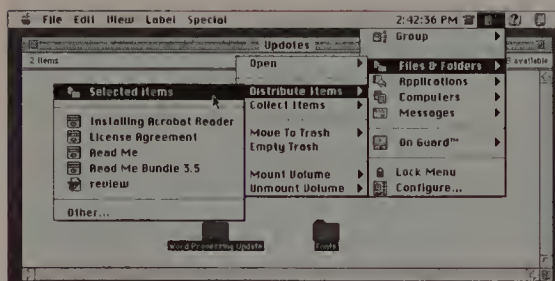
**Y**OU KNOW HOW TEDIOUS BASIC administration tasks can be if you've ever needed to copy a file to every machine on your network. Unfortunately, sophisticated management tools are simply too complex and too expensive for some environments. Power On Software has tackled this problem with LAN Commander 1.0, a utility that simplifies basic software distribution to, auditing of, and remote control of Macintosh workstations.

The LAN Commander (formerly known as Net Commander) interface lets you access all functions via a pull-down menu on the right-hand side of the menu bar. Simple dialog boxes allow you to specify commands and target workstations. For many commands, you can designate files by selecting them in the Finder.

LAN Commander provides most of the basic features that administrators of small, Mac-only environments will want. You can take files from a local workstation and distribute them to other Macs; LAN Commander automatically creates the appropriate directories on the remote machines. LAN Commander lets you delete files on networked machines, or even mount and unmount server volumes on remote desktops.

Administrators needing basic remote-control capabilities will appreciate LAN Commander's ability to launch applications, restart or shut down machines, set monitor depth and sound levels, and even enable or disable file sharing. The Application Status dialog box displays a table of application information and allows you to open, close, show, or hide applications on a group of machines. You can force an application to return to the foreground whenever a user tries to switch to a different program, and you can lock the screen and keyboard of selected Macs. Although LAN Commander doesn't offer the full remote-control feature set of Farallon's Timbuktu, I found it handy for controlling machines on my network.

LAN Commander can also collect software and hardware information from workstations, though this is its most limited feature, offering only a small subset of the information provided by other inventory tools, no export capability, and buggy analysis tools. Worse, I was unable



**Easy Access** LAN Commander's interface lets you reach any feature from a single hierarchical menu.

to search successfully for workstations based on drive size or installed RAM; Power On's tech support confirmed that the "greater than" and "less than" parameters are reversed—to find machines with drives over 100MB, you have to search for ones with drives *under* 100MB.

Even administrators who appreciate LAN Commander's simplicity may find themselves wishing for additional features. The ability to save frequently performed commands would prevent a great deal of repetition. A plug-in architecture would allow easy extension of LAN Commander's relatively limited feature set. And the ability to work with Windows workstations is a necessary, if distasteful, requirement for many support folks.

LAN Commander seems hastily developed. Selecting any menu option launches a program called LAN Commander Startup, which serves no purpose other than handling command execution. This application sports the generic icon generated by the CodeWarrior compiler used to create it, and has no interface except a duplicate command menu.

## The Last Word

LAN Commander provides fewer features than network-management tools like Symantec's Norton Administrator for Networks and DataWatch's netOctopus, but it's much easier to use. Though this initial release leaves room for improvement, many part-time or novice administrators will find LAN Commander's ease of use attractive.—J.W. DAVIS

**RATING:** ★★ ★/6.5 **PROS:** Simple interface, well suited for labs and classrooms. **CONS:** Feels unfinished; limited feature set. **COMPANY:** Power On Software (612/879-9190, <http://www.poweronsw.com>). **LIST PRICE:** Five-station pack \$299.95 (education and volume pricing available).

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# Tapestry 1.1

FOOLPROOF WEB DESIGN FOR ROOKIES

**i** THE INFORMATION WISK ONE LOOK AT HTML CODE should tell you why so many Web pages are created by programmers rather than designers. If you have design skills but neither the time nor the desire to learn HTML, you have several WYSIWYG Web authoring tools to choose from. One of the latest is Concept 1's Tapestry; like Adobe PageMill, it offers a fast, easy way to build an attractive Web presence. But while Tapestry offers some unique features, its simplistic approach and lack of support for Netscape-specific elements make it inappropriate for all but the most recent newcomers to Web publishing.

Tapestry may well be the most user-friendly of all HTML editors, with its simple 12-button tool bar, drag-and-drop approach, and support for multiple languages. You place JPEGs, GIFs, and QuickTime videos in an open document by dragging them from the desktop. To resize an image, you pull its borders in or out. You manipulate text just as you would in your word processor, and adding a background image or pattern is as simple as dragging a file onto the tool bar (see "Drag and Drop").



**Drag and Drop** You import backgrounds by simply dropping an image onto the tool bar.

Tapestry also simplifies the process of creating links, letting you drag and drop hot links from Netscape Navigator onto highlighted text. Once you've finished your Web page and saved it as a Tapestry file, you select the Build Site command to create a fully editable HTML document, check for syntax errors and missing or broken links, and round up your graphics for uploading to a server. Tapestry displays a question-mark icon on a page in place of instructions it doesn't recognize, then flags the unfamiliar code when building your site. You can save the document anyway, but such icons

and error messages are troubling reminders of the program's limited lexicon.

Concept 1 plans to enrich Tapestry's vocabulary in later versions, though it has promised to add only two Netscapisms—tables and multiple frames—in the next release. And although the company says we can also expect multiple levels of undo, find and replace, and option-click toggling between browse and editing modes, at the moment Tapestry won't let you so much as peek at the HTML behind your document, and an Undo button is dismayingly absent.

**The Last Word** With its low price and accessible interface, Tapestry is an irresistible tool for newcomers to Web design. This version delivers on its promise to bridge the gap between nonprogrammers and their Web publishing dreams. As long as Concept 1 can keep up with advancements in HTML and make good on its promise to add much-needed features, Tapestry will likely have a place in the exploding Web publishing market.—MARK BAARD

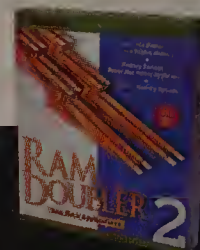
**RATING:** ★★/6.7 **PROS:** Drag-and-drop importing; WYSIWYG authoring. **CONS:** Limited HTML vocabulary; no Undo; no support for tables or frames. **COMPANY:** Concept 1 (905/305-8655, <http://www.concept1.com>). **LIST PRICE:** \$69.

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# GlobalTransfer

TRANSFERRING FILES THE EASY WAY

**S**AY YOU WANT TO SEND A FILE TO A friend via modem. Chances are, your first thought is to send the file as an attachment to an E-mail message. As long as you and your friend use the same online service, the transfer should work just fine. But if you're on America Online and your friend has an Internet account, things get dicey. If both of you have Internet accounts, the file needs to be Bin-Hex-encoded on the sending machine and decoded on the receiving end, and even then it may be unreadable. You could transfer files using a modem and a telecommunications program, but configuring such programs can be daunting for the novice.

An alternative is Global Village's GlobalTransfer 1.0. It allows direct file transfers without the complexity of telecommunications software, and it makes sending and receiving files a snap.

GlobalTransfer's interface is deceptively simple (see "It Doesn't Get Any Easier"). Behind the scenes, the software implements the efficient, industry-standard Zmodem file-transfer protocol. Zmodem can send up to 32 files at a time; it sends large data pack-



**It Doesn't Get Any Easier** Talk about stripping the interface down to the essentials! Click on Send Files to select a file and its destination; click on Receive Files to prepare your Mac to accept a transmission.

ets, so transmission is faster; it reports in detail on the transfer's progress; and best of all, if a transfer is interrupted, Zmodem picks up where it left off when the connection is reestablished. And because Zmodem is the standard for both Macs and PCs, the recipient can use almost any telecommunications program. The only drawback is that Zmodem deals with files, not folders, so separate files end up in a single folder on the recipient's machine.

Setting up and using GlobalTransfer couldn't be simpler. The first time you run the program, it interrogates your modem and automatically configures itself; from then on, you follow the on-screen instructions. Clicking on Send Files takes you to

an Open File dialog box, where you can specify one or more files to send. You enter or select the recipient's name and phone number from the phone book that appears, then click on Send to start the process. If the transfer is interrupted, GlobalTransfer automatically redials the recipient, changes the transfer speed to improve reliability, and continues sending the files.

Included with the package is GlobalTransfer Lite, a demo version of the program that you can distribute freely to people with whom you'll be exchanging files. After the 30-day evaluation period, the program will no longer send files, though it will continue to receive them.

**The Last Word** GlobalTransfer banishes the mumbo jumbo of communications parameters and replaces them with a clean, easy-to-use interface, and the free Lite version makes it easy to set up your colleagues to exchange files. If you need to transfer files and you can't (or prefer not to) use E-mail, give GlobalTransfer a try.—TOM NEGRINO

**RATING:** ★★★/6.7 **PROS:** Easy to use; auto-configures modems; forgiving of phone-line mishaps. **CONS:** Doesn't understand folders. **COMPANY:** Global Village (408/523-1000, <http://www.globalvillage.com>). **LIST PRICE:** \$29.95.

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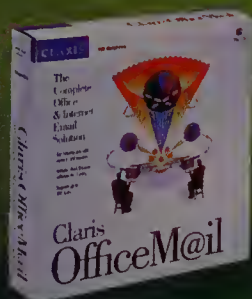


Requirements: Macintosh equipped with a PowerPC 68040 or 68030 microprocessor • System 7.0 or greater • 8 MB physical RAM or greater • Compatible with Connectix RAM Doubler • Not compatible with Mac Plus, Mac SE, original Mac Classic, original Mac IIx or PowerBook 100

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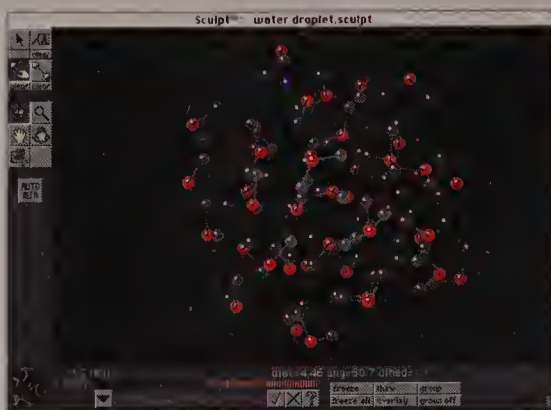


# Sculpt 2.0

MOLECULAR MODELING PICKS UP SPEED

**U**NTIL NOW, ONE KEY FEATURE HAS been missing from molecular modeling programs: speed. But Interactive Simulations has done some clever fiddling with computational and display algorithms, and the result—Sculpt 2.0—is jaw-droppingly fast. I'm an old-timer in the molecular modeling business and a hopeless optimist where computers are concerned, but I never expected to see something this good running on a non-workstation desktop box in my lifetime.

Designed for chemists and molecular biologists, Sculpt builds some amenities into its modeling functions. A Movie function records your molecular twists, turns, and shape changes as a QuickTime movie. An AutoMin button gives you single-click minimization when you tug on atoms. Freeze and Thaw buttons let you move small sections of a large molecule while the rest remains fixed. You can also use the Freeze and Thaw functions on sections of molecular clusters. Besides using Sculpt in the expected way—to model peptide properties—you can simulate large clusters of small molecules (see "Splash").



**Splash** This water droplet surrounds an ion, but it could just as easily be set up to adhere to a wall for surface-interaction modeling.

One of the reasons for Sculpt's speed is that it performs only a handful of functions: you can display, rotate, zoom, and edit molecules, and you can use electrostatic and van der Waals energies (on single molecules or collections) to search for minimum-energy conformations. That's it—there's no draw program or chemical database, nor any of the small-molecule quantum mechanics that typically appear in modeling programs.

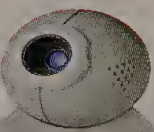
Interactive Simulations' argument for limiting Sculpt's province is twofold: its users are mostly interested in larger molecules and complexes, and the Mac OS can place a speed penalty on bigger programs. This version runs about 80 percent as fast

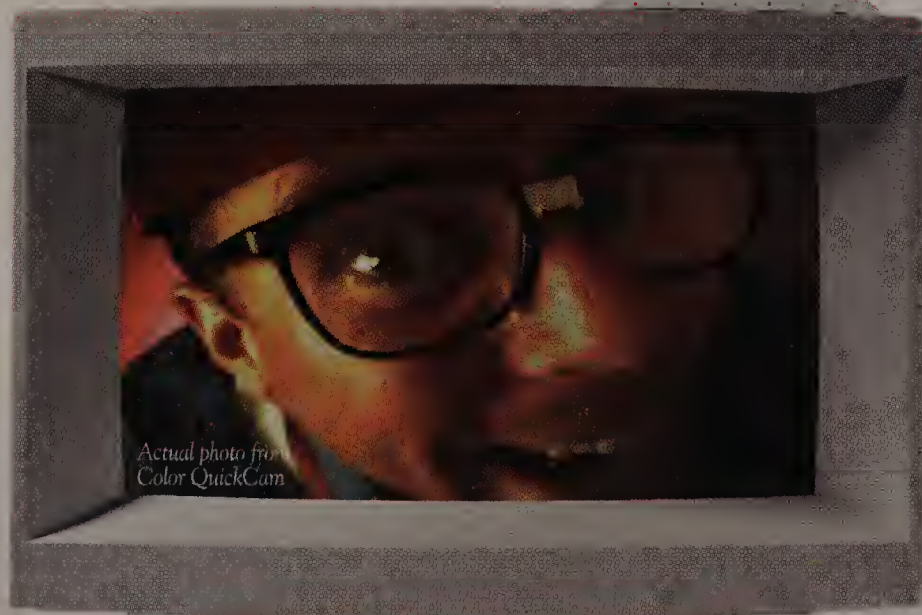
on a Power Mac 7100 as on a Silicon Graphics workstation; on a 180MHz clone from Power Computing, Sculpt is faster than it is on the hottest desktop box in the Unix world. Because Sculpt offers bare-bones modeling, it ships with CambridgeSoft's ChemOffice Ltd. for doing preliminary drawing. You can open this useful program in Sculpt and in cataloging structures, and it includes ChemDraw, an application that lets beginners start drawing molecules right away (Sculpt imports ChemDraw and Protein Data Bank files).

**The Last Word** Sculpt 2.0 is not a demonstration of concepts or a mostly educational program; it's for chemists and molecular biologists who want to do primary research at workstation speeds. That's a great leap forward in this corner of science for the Mac (Sculpt is not yet available for Windows), and it proves that a 100MHz-plus Power Mac really *is* a scientific workstation.—CHARLES SEITER

**RATING:** ★★★★★/8.8 **PROS:** Phenomenal speed; easy to learn; well-documented methodology **CONS:** Limited file-exchange options **COMPANY:** Interactive Simulations (619/658-9462, <http://www.intsim.com>). **LIST PRICE:** \$895; academic version \$595.

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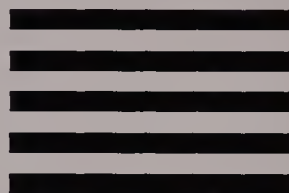
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~~The microfilm was stuffed in his cheeks. If they made him talk, he would swallow and recover it later.~~

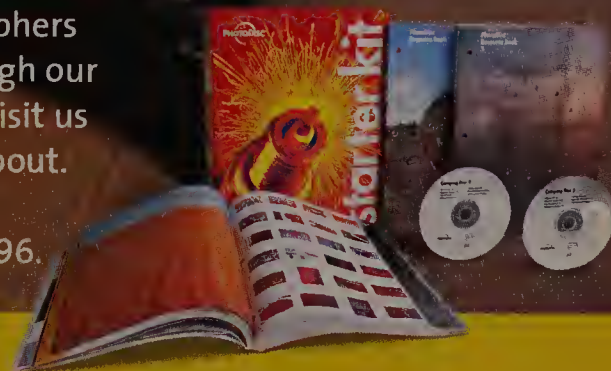
~~How long could he hold his breath before she would say yes?  
2 minutes? maybe more.~~

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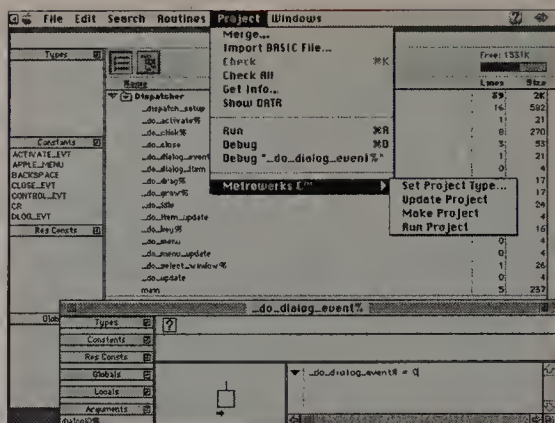


# VIP-BASIC 2.0

BASIC ADAPTS TO LIFE IN THE NINETIES

**B**ASIC ON THE MAC IS STILL POPULAR with many hobbyists, but over the years the selection of commercial products for this language has become . . . well, basic. The choices have dwindled to two: Staz Software's FutureBASIC II (see *Reviews*, July 1996) and now Mainstay's VIP-BASIC 2.0. FutureBASIC is a fine product, but VIP-BASIC incorporates some shrewd design decisions.

The first such decision was to build a translator that takes the code you create in VIP-BASIC's convenient programming environment (where "programming" usually involves selecting from a list of Toolbox calls and prepared VIP-BASIC routines) and turns it into Metrowerks C. Translating, compiling, and running the converted C-code project takes only a few commands in VIP-BASIC (see "Code to Go"), if you have Metrowerks' CodeWarrior 7 or later. Mainstay was forced to take this approach not just by the rising tide of C, but by incompatibilities with the FutureBASIC compiler (about the last Mac BASIC compiler left on the market). You can still program exclusively in BASIC using the



**Code to Go** VIP-BASIC accepts the realities of current compiler technology and gives you automatic porting to Metrowerks C.

included run-time module, but this new translating capability means you can work up a program in this cozy environment and port it to, say, a C-language Windows program in the CodeWarrior environment. That's true portability.

The second decision was to modularize VIP-BASIC by taking the function and subprogram libraries and resource editors out of the program itself and putting them in a special file in the System Extensions folder. Not only does that approach let Mainstay update VIP-BASIC incrementally, but it makes the final applications smaller and faster—the source code for a simple drawing program uses less than 20K.

Mainstay has improved VIP-BASIC's user interface by adding a folder structure and displaying code-size data in the project window, while the coding interface has been pumped up with a sophisticated forms editor. Forms in VIP-BASIC use an assortment of built-in screen elements, such as check boxes and editable text windows. Combined with the VIP Database Manager (a limited version of which is included), the forms editor makes database programming fast and almost fun.

The VIP-BASIC package is truly paperless, with no printed documentation of any kind. Fortunately, the manual included on the CD is helpful and complete, with a step-by-step tutorial.

**The Last Word** If you're more comfortable in BASIC than in other languages, VIP-BASIC is an unbeatable investment. It's easy to learn, easy to use, and bracingly fast. With this product, there's life in the old language yet.—CHARLES SEITER

**RATING: ★★★★★/8.0** **PROS:** Great links to C; superior forms and database tools. **CONS:** Can't use the only popular Mac BASIC compiler; no printed documentation. **COMPANY:** Mainstay (805/484-9400, <http://www.mstay.com>). **LIST PRICE:** \$295.

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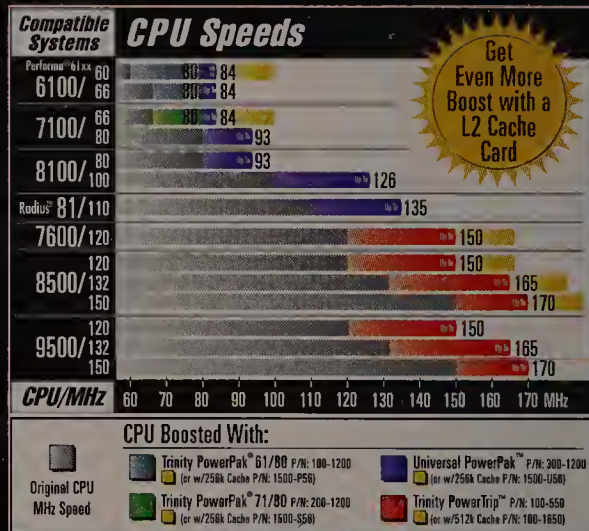
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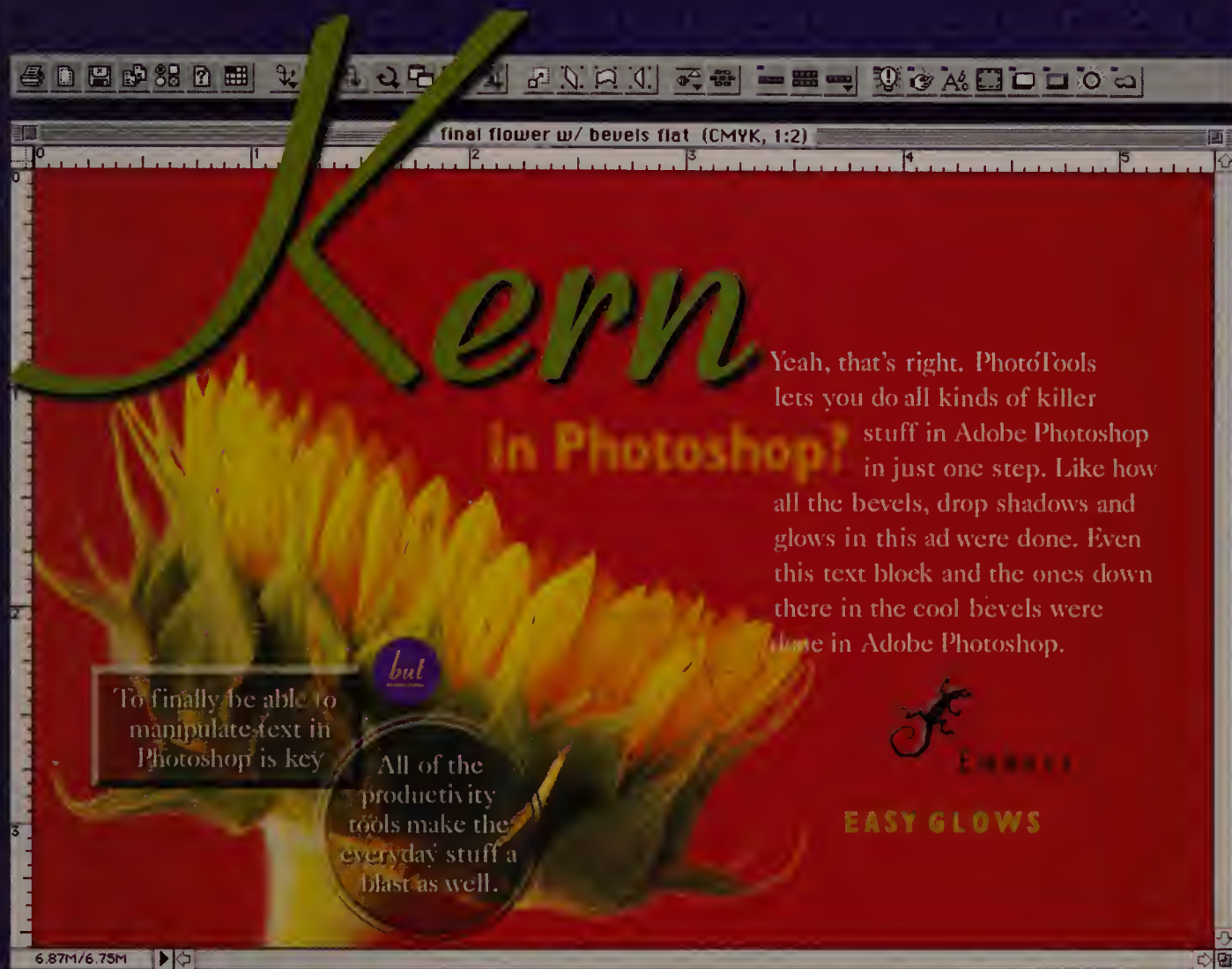
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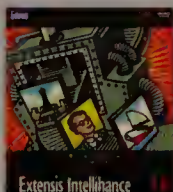
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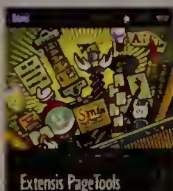
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## Quest for Fame

IT'S ONLY ROCK AND ROLL . . .

**F**OR LEGIONS OF JUKEBOX HEROES, Virtual Music's Quest for Fame could have been more than just some new sensation. The idea behind Quest for Fame is the stuff of rock-video dreams: you start in your bedroom with a beat-up six-string, and progress to playing sold-out stadium shows with Aerosmith. Too bad you can't always get what you want.

In the growing field of music adventures, Quest for Fame's unique hook is the Vpick, a hardware device—which looks like nothing so much as a guitar pick designed by Fisher-Price—that connects your wrist to Quest for Fame via your Mac's serial port. Although you can strum the Vpick on your shirt, it's worth taking the time to scrounge up an ersatz guitar (like an old tennis racket) so you can use a true rocker's up-and-down picking motion to increase your rhythmic agility and to feed your air-guitar jones. Choose your weapon carefully—the Vpick is a finicky little device, and unless you hit it just right, you might as well be swinging a dead piece of plastic.

You strum your Vpick in time to the guitar parts of prerecorded music tracks,



**Hand Jive** Band practice is a great way to sharpen your chops, but blow too many notes and your mates will tell you to walk this way . . . right out the door.

taking your cues from the Rock EKG, a long pane traversed by a moving vertical line like the bouncing ball of karaoke. When the line crosses a Rock EKG spike, you hit the pick. The result appears as a downward-pointing spike in the Rock EKG window, showing if you nailed the beat. Quest for Fame has the notes for your part queued up, so you hear your jams laid over the band's tracks as you play.

Or that's the way it's *supposed* to work. In reality, the developers blew the single most important part of the package: synchronization between the music, the Vpick input, and the screen display. Quest for Fame is fun when you're playing basic

rhythm guitar and well-known riffs, but trying to learn complicated lead parts is like walking bare-shinned through a dark room full of coffee tables. Even on a Power Mac, any attempt to play fast passages by sight is doomed to failure. I've played guitar for eight years, and after three days of Questing for Fame on the beginner level, I was so frustrated that I was tempted to pull a Townshend on the Vpick, leaving nothing but shattered plastic crumbs.

**The Last Word** Quest for Fame's execution is a tremendous disappointment, as the game has a lot going for it otherwise. The atmosphere is lighthearted, the production is engaging, and the premise is multiplatinum material. Two pieces of advice for the game's producers: do whatever you have to do to sync the Vpick with the sound and display, and give players a way to pick apart tunes to memorize tough licks. Call us when you've got the kinks worked out of your act; we'll be waiting.—CAMERON CROTTY

**RATING:** ★★/3.5 **PROS:** Clever "real" air-guitar premise; good production values. **CONS:** Frustrating lack of synchronization between game and Vpick. **COMPANY:** IBM Virtual Music Entertainment (508/688-8800, <http://www.virtualmusic.com>). **LIST PRICE:** \$48.95.

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# Wing Commander IV

MINOR IMPROVEMENTS TO A CLASSIC

**T**HE WAR WITH KILRATHI MAY BE history, but Colonel Christopher Blair's troubles are far from over. In *Wing Commander IV: The Price of Freedom*, the Confederation war machine is being disassembled, when trouble springs up anew. The Border Worlds—allies during the Kilrathi Wars—are rebelling against the Confederation, and once again it falls to Blair to set things right.

Fans of the previous games in the *Wing Commander* series won't be disappointed by this latest sequel. *Wing Commander IV* (WC4) offers all the features that made its predecessors successful. A masterful story line is WC4's greatest strength, conveying the sense of being in the midst of a great struggle. Well-known actors—including *Star Wars*' Mark Hamill—lend their talents to the game, giving it greater impact than many competitors that seem to have found their "talent" at the local bar.

The game's focus is fighting, but you're occasionally called upon to choose between two courses of action. Instead of being simple window dressing, these choices affect the course of the game. A decision made



**Frigate Flambé** Well-rendered in-flight graphics add to the fun of blowing away your opponents.

early on can come back to haunt you when you least expect it.

On the technical side, WC4's fly-time graphics are amazing: a wide selection of fighter planes are available, as is a diverse support arsenal. Ships remain clear and well rendered even at high speeds. Combat flying is generally smooth, although you can forget about using a keyboard unless you are one of the truly gifted.

*Wing Commander IV*'s flight engine is basically sound, but it's also the game's weakest point. *Wing Commander III* left a lot of room for improvement, but very little was done to bolster its shortcomings. New features like autosliding—inertial cruise control—and autotargeting have

been added, but they don't make up for lingering flaws. The navigation map is useless, serving only to reiterate mission directives; a tactical map would work much better. The radar system is also difficult to use and makes it hard to find specific targets.

WC4's missions are designed to be challenging even for a seasoned vet, but some can prove particularly difficult due to insufficient pilot briefing data and must be solved through an annoying process of trial and error. Still, the missions' diversity keeps the game from being a repetition of basic search-and-destroy tactics; simple reconnaissance missions and ground insertions link individual battles in a realistic, all-encompassing war.

**The Last Word** *Wing Commander IV* successfully blends video clips, action sequences, and a bit of mystery to create an entertaining product with a deep sense of player involvement.—DANIEL MADAR

**RATING: ★★★★★/7.1** **PROS:** Engaging story line; great graphics and action. **CONS:** Does not significantly improve on its predecessor; minor changes could make the game considerably better. **COMPANY:** Origin/Electronic Arts (512/434-4263, <http://www.ea.com/origin.html>). **COMPANY'S ESTIMATED PRICE:** \$50.

# revealed.

...set this end for a different tool. Or you can set it for a different mouse button, a double-click—or go to your favorite tool without having to mouse around.

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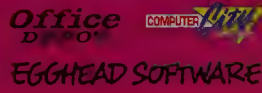
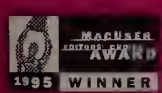
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# THERE'S A PLACE WHERE WALLS BETWEEN OFFICES ARE REPLACED BY WORDS.

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*Where questions never go unanswered.*  
Where the people you need to find can always be found.

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*Where information forever eludes the bottleneck.*  
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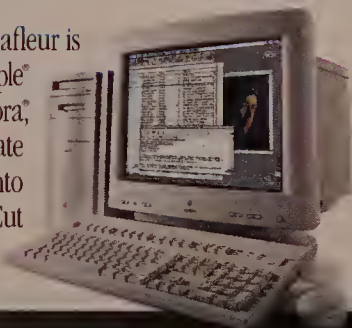
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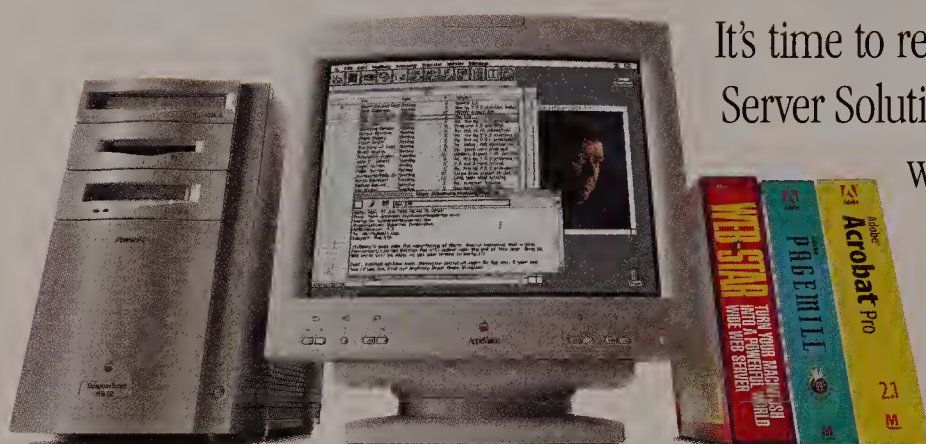


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# Star Ratings

## HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

*Macworld Star Ratings* lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

★★★★★	9.0 to 10.0	Outstanding
★★★★	7.0 to 8.9	Very Good
★★★	5.0 to 6.9	Good
★★	3.0 to 4.9	Flawed
★	0.0 to 2.9	Unacceptable

This section also lists products that have been awarded an **Editors' Choice** designation in a *Macworld* product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via *Macworld* Online (keyword *Macworld* on America Online; URL <http://www.macworld.com> on the World Wide Web).

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#### BUSINESS

- ★★★★/8.8 **4th Dimension 3.5**, ACI US, 408/252-4444, \$895. Leading Mac database gets important improvements. *Mar 96, p. 60.*
- ★★★★/8.4 **ClarisWorks 4.0**, Claris, 408/727-8227, \$129 (estimated). Integrated software's speed, clean design, and low resource requirements put the big boys to shame. *Jun 96, p. 98.* **Editors' Choice** for best integrated software. *Nov 95, p. 124.*
- ★★★★/9.5 **DeltaGraph 4.0**, DeltaPoint, 408/648-4000, \$195. Top Mac graphing application still excels. *Sep 96, p. 90.*
- ★★★★/8.2 **FileMaker Pro 3.0**, Claris, 408/727-8227, \$199. FileMaker 3 is now relational and more useful than ever. *Apr 96, p. 56.* **Editors' Choice** for

best database software. *Jun 96, p. 98.*

- ★★★★/7.0 **GeoQuery 5.0**, GeoQuery, 708/357-0535, \$295. Put your business data on the map. *Sep 96, p. 92.*

- ★★★★/7.7 **LabView 4.0**, National Instruments, 512/794-0100, \$1995. The biggest and best in lab software keeps growing. *Aug 96, p. 67.*

- ★★★★/7.8 **Let's Keep It Simple Spreadsheet 1.0**, Casady & Greene, 408/484-9228, \$189.95. New approach to spreadsheets uses graphical programming style. *Sep 96, p. 67.*

- ★★★★/6.9 **Micro Planner Manager 1.4**, Micro Planning International, 303/757-2216, \$695. Project-management application takes scheduling seriously. *Jun 96, p. 65.*

- ★★★★/7.1 **Microsoft Excel 5.0**, Microsoft, 206/882-8080, \$295 (estimated). The only game in town for number-crunching pros, but a glutton for RAM and disk space. *Jun 96, p. 98.*

- ★★★★/6.9 **Microsoft PowerPoint 4**, Microsoft, 206/882-8080, \$295 (estimated). A solid, simple-to-use slide machine. *Jun 96, p. 98.*

- ★★★★/6.7 **Microsoft Word 5.1**, Microsoft, 206/882-8080, \$320 (estimated). Fast, sleek, stable Mac word processor. *Jun 96, p. 98.*

- ★★★★/5.1 **Microsoft Word 6.0.1**, Microsoft, 206/882-8080, \$295 (estimated). The most bloated word processor on earth may be mandatory in big corporations. *Jun 96, p. 98.*

- ★★★★/7.2 **Minitab 10 Xtra**, Minitab, 814/238-3280, \$895. Updated package offers a complete statistical tool kit. *Jun 96, p. 66.*

- ★★★★/7.1 **OmniPage Pro 6.0**, Caere, 408/395-7000, \$699. Flagged-text feature is indispensable and handles gray-scale graphics. *Jun 96, p. 54.*

- ★★★★/7.1 **Panorama 3.0**, ProVue, 714/841-7779, \$290 (estimated). Database program features easy forms and fast network abilities. *Jun 96, p. 98.*

- ★★★★/6.4 **Persuasion 3.0**, Adobe Systems, 206/470-7000, \$259 (estimated). Hard to use, but offers every presentation effect a pro could need. *Jun 96, p. 98.*

- ★★★★/6.4 **PowerBuilder 4.0**, Powersoft, 508/287-1500, \$3295. Cross-platform development tool comes to the Mac at last. *Aug 96, p. 71.*

- ★★★★/7.7 **QuickBooks Pro 4.0**, Intuit, 415/944-6000, \$189. Accounting package can be customized for your business. *Jun 96, p. 55.*

- ★★/4.2 **SoftWindows 3.0**, Insignia Solutions, 408/327-6000, \$379. Slow, but useful for those places where Windows 3.1 still rules. *Sep 96, p. 58.*

- ★★/4.3 **SoftWindows 95 1.0**, Insignia Solutions, 408/327-6000, \$379. If you use PC software regularly, consider a hardware solution. *Sep 96, p. 58.*

- ★★★★/7.0 **TextBridge Pro 3.0**, Xerox, 508/977-2000, \$349. Easy to select and supports graphics, but does not flag unrecognized text. *Jun 96, p. 54.*

- ★★★★/7.4 **WordPerfect 3.5**, Corel, 613/728-8200, \$129 (estimated). In speed, interface, and Mac integration, WordPerfect beats all competitors. *Jun 96, p. 98.*

- ★★/4.0 **WorldWrite 3.0**, WorldSoft, 801/350-9490, \$149. New word processor is promising but nothing to write home about. *Aug 96, p. 73.*

#### DESKTOP PUBLISHING

- ★★★★ **Adobe PageMaker 6.0**, Adobe Systems, 206/622-5500, \$895. Page-layout program with practical and powerful improvements. *Nov 95, p. 60.*

- ★★★★/8.7 **Adobe Type Manager 3.9**, Adobe Systems, 415/961-4400, \$39.95. Accurately renders PostScript fonts at all sizes on screen and on any printer. *Apr 96, p. 102.*

- ★★★/6.0 **MasterJuggler Pro 2.0**, Alsoft, 713/353-4090, \$89.95. MasterJuggler wants to be your favorite font manager. *Sep 96, p. 72.*

- ★★★★/7.0 **PageTools 2.0**, Extensis, 503/274-2020, \$99.95. Plug-ins add power and precision to PageMaker. *May 96, p. 65.*

- ★★★★/6.1 **Ready,Set,Go 7.0.2**, Abbott Systems, 914/747-3116, \$395. Revamped page-layout software offers more than the basics. *Sep 96, p. 83.*

- ★★★/6.1 **Suitcase 3.0.1**, Symantec, 503/334-6054, \$69.95. Font manager vies with MasterJuggler for superiority, and still no clear winner. *Sep 96, p. 72.*

- ★★★★/8.9 **SuperATM 3.9**, Adobe Systems, 415/961-4400, \$69. ATM's PostScript font rendering plus intelligent substitution of missing fonts. *Apr 96, p. 102.*

- ★★★★/5.3 **UniQorn 1.01**, SoftPress Systems Limited, 415/331-4820, \$895. Page-layout program has QuickDraw GX support—but not much else. *Aug 96, p. 56.*

- ★★★/5.1 **Xdream 1.0**, Vision's Edge, 904/386-4573, \$149. Collection of 24 tools ranging from useful to indispensable. *Jun 96, p. 50.*

- ★★★★/7.1 **XPert Tools 1.0**, XChange, 415/864-7592, \$99 to \$169. If you need to go beyond Quark's feature set, XPert Tools will take you there. *Jun 96, p. 50.*

#### EDUCATION/ENTERTAINMENT

- ★★★★/8.8 **Bad Mojo 1.0**, Pulse Entertainment, 310/264-5579, \$54.95. Want to be a fly on the wall? *Sep 96, p. 96.*

*continues*



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# Star Ratings

- ★★★/6.8 **Bartlett's Familiar Quotations 1.0**, Time Warner, 212/522-0680, \$39.95. CD-ROM proves you can teach an old reference new tricks. *Aug 96, p. 82.*
- ★★/3.8 **Chaos 1.0**, HarperCollins Interactive, 212/207-7000, \$49.95. High-concept CD-ROM game is low on entertainment. *Sep 96, p. 100.*
- ★★★★/7.1 **College Advisor**, Princeton Review Publishing, 617/272-7027, \$19.95. Help with one of life's big choices. *Aug 96, p. 84.*
- ★★★★/7.2 **Connections**, Discovery Channel Multimedia, 301/986-0444, \$49.95. Ideas and entertainment link up in this game. *Aug 96, p. 88.*
- ★★★/6.9 **Dramatica Writer's Dream Kit 1.7**, Screenplay Systems, 818/843-6557, \$149. Powerful writer-assistance software refines your fiction. *Aug 96, p. 83.*
- ★★/4.1 **Juilliard Music Adventure**, Theatrix Interactive, 510/658-2800, \$34.95. Kids' music package misses the mark. *Aug 96, p. 75.*
- ★★★/5.3 **A Little Kidmusic**, Ars Nova, 206/828-2711, \$75. Short on theory, long on entertainment. *Aug 96, p. 75.*
- ★★★★/7.7 **Toy Story Animated StoryBook 1.0**, Disney Interactive, 800/900-9234, \$35. Disney sets a 3-D standard for children's interactive tales. *Sep 96, p. 94.*

## GRAPHICS

- ★★/4.9 **3D World 1.0**, Microspot USA, 408/253-2000, \$139. Affordable but limited QuickDraw 3D design tool. *Jul 96, p. 74.*
- ★★★★/7.1 **Adobe Illustrator 6.0**, Adobe Systems, 415/961-4400, \$595. Upgrade's minor tweaks aren't enough to surpass FreeHand 5.5. *Apr 96, p. 54.*
- ★★★★/8.5 **Adobe Photoshop 3.0.5**, Adobe Systems, 415/961-4400, \$895. Single most significant and capable image editor. *Jun 96, p. 78.*
- ★★★★/7.9 **The Black Box 2.0**, Alien Skin Software, 919/832-4124, \$119. Straightforward Photoshop filters for creating drop shadows, bevels, and glass refraction effects. *Sep 96, p. 120.*
- ★★★★/7.7 **Bryce 2**, MetaTools, 805/566-6200, \$299. Create awe-inspiring, photorealistic 3-D landscapes. *Aug 96, p. 59.*
- ★★★/6.1 **Bump 1.0**, AtoZ Software, [atozsoft@aol.com](mailto:atozsoft@aol.com), \$49. Photoshop filter applies shadows and highlights. *Sep 96, p. 120.*
- ★★★/6.8 **Chris' Filters 1.0**, Chris Cox, [cc4b@andrew.cmu.edu](mailto:cc4b@andrew.cmu.edu), shareware. Photoshop filters enhance productivity with a few special effects. *Sep 96, p. 120.*
- ★★★/6.9 **Cumulus 2.5**, Canto Software, 415/905-0300, \$1795. Turn your multimedia archives into a network image database. *Aug 96, p. 55.*
- ★★★★/8.0 **CyberMesh 1.11**, Knoll Software, 415/453-2471, \$49. Exports Photoshop gray-scale images as 3-D DXF models. *Sep 96, p. 120.*
- ★★★★/7.7 **Extreme 3D 1.0**, Macromedia, 415/252-2000, \$699. MacroModel weds Three-D, lives happily ever after. *Jul 96, p. 60.*
- ★★★/6.5 **Gallery Effects 1.0**, Adobe Systems, 415/961-4400, \$99. Useful edge-enhancement and texture Photoshop filters priced to sell. *Sep 96, p. 120.*
- ★★★★/7.4 **IntelliHance 2.0.1**, Extensis, 503/274-2020, \$99.95. Photoshop plug-in automates

improving scanned images. *Sep 96, p. 120.*

- ★★★★/8.3 **Kai's Power Tools 3.0.2**, MetaTools, 805/566-6200, \$199. Excellent Photoshop gradient and distortion filters with a fanciful, sometimes bizarre interface. *Sep 96, p. 120.*
- ★★★★/7.5 **KPT Convolver 1.0**, MetaTools, 805/566-6200, \$199. Provides an infinite range of focus, edge-detection, and color-embossing Photoshop effects. *Sep 96, p. 120.*
- ★★★/6.9 **KPT Cool Effects 1.0**, MetaTools, 805/566-6200, \$29. "Kai's Power Tools Lite" at a bargain price. *Aug 96, p. 88.*
- ★★★★/7.4 **Kwick Mask, Create B/W, and Rotate Color 1.0**, Hugh Kawahara, <http://www.stanford.edu/~>, freeware. Photoshop filters preview effects directly inside the image window. *Sep 96, p. 120.*
- ★★★★/7.2 **Live Picture 2.5**, Live Picture, 408/464-4200, \$995. Innovative image editor boasts many improvements. *Jun 96, p. 78.*
- ★★★/6.9 **Lumpy Noise 1.0**, Paul Badger, [pbadger@cgrg.ohio-state.edu](mailto:pbadger@cgrg.ohio-state.edu), freeware. Free Photoshop plug-in applies a coating of thick, chunky noise. *Sep 96, p. 120.*
- ★★★★/8.1 **Macromedia FreeHand 5.5**, Macromedia, 415/252-2000, \$595. Draw program outperforms competitor, for now. *Feb 96, p. 74.*
- ★★★★/7.7 **Paint Alchemy 2.0**, Xaos Tools, 415/487-7000, \$199. Photoshop filter applies brushstrokes to create impressionistic effects. *Sep 96, p. 120.*
- ★★★/8.9 **Painter 4.0**, Fractal Design, 408/688-5300, \$549. Painting and special-effects capabilities simply can't be beat. *Jun 96, p. 78.*
- ★★★/6.5 **PhotoLab 1.2**, Cytopia Software, 415/364-4594, \$99.95. Color-correction filters take up where Photoshop leaves off. *Sep 96, p. 120.*
- ★★★★/7.7 **PhotoMatic 2.0.1**, DayStar Digital, 770/967-2077, freeware. Photoshop filter adds batch processing and AppleScript support. *Sep 96, p. 120.*
- ★★★/6.9 **PhotoNavigator 1.0**, Extensis, 503/274-2020, freeware. Photoshop filter provides thumbnail views for quick scrolling. *Sep 96, p. 120.*
- ★★★/6.2 **PlateMaker 1.0.2**, A Lowly Apprentice Productions, 619/438-5790, \$295. Photoshop filter exports CMYK with spot-color channels to DCS 2.0 format. *Sep 96, p. 120.*
- ★★★/6.9 **Ray Dream Studio 1.0**, Ray Dream, 415/960-0765, \$499. 3-D design tools are competent and affordable. *May 96, p. 58.*
- ★★★★/7.0 **Sculpt 3D 4.1**, Byte by Byte, 512/305-0360, \$495. High-end 3-D for the mainstream. *Sep 96, p. 81.*
- ★★★★/8.2 **Series 2, 3-D Filter 2.11**, Andromeda Software, 805/379-4105, \$129. Photoshop filter projects images onto three-dimensional cubes, spheres, and cylinders. *Sep 96, p. 120.*
- ★★★★/9.2 **Series 3, Screens Filter 1.4**, Andromeda Software, 805/379-4109, \$159. Converts Photoshop images into alternative halftone patterns. *Sep 96, p. 120.*
- ★★★★/8.7 **SmartSketch 1.0**, FutureWave Software, 619/637-6190, \$69.95. Makes drawing and editing paths as easy as painting. *Mar 96, p. 106.* **Editors' Choice** for best natural draw programs.
- ★★★/6.6 **Sucking Fish 1.01**, Naoto Arakawa, [gca00443@nittyserve.or.jp](mailto:gca00443@nittyserve.or.jp), freeware. Offbeat, undocumented Photoshop gradient and pattern filters. *Sep 96, p. 120.*
- ★★★/6.8 **Terrazzo 1.0**, Xaos Tools, 415/487-7000, \$199. Photoshop filter repeats images to create seamless, organic pattern. *Sep 96, p. 120.*
- ★★/3.7 **Tropix 2.0.5**, Alaras, 919/544-1228, \$4990. Image database tames chaotic files—but not always successfully. *Aug 96, p. 55.*

★★★★/7.5 **TypeCaster 1.0**, Xaos Tools, 415/487-7000, \$199. Adds three-dimensional text to any Photoshop image. *Sep 96, p. 120.*

★★★/6.3 **xRes 2.0**, Macromedia, 415/252-2000, \$799. Although fast, and easy to learn, this image editor has room for improvement. *Jun 96, p. 78.*

## INTERNET/NETWORKING

- ★★★/6.5 **BEdit 3.52**, Bare Bones Software, 508/651-3561, \$119. Web-authoring tool targets power users. *Jun 96, p. 61.*
- ★★★/6.9 **Cyberdog 1.0**, Apple Computer, 408/996-1010, free. Internet tools are an interesting but incomplete showcase for OpenDoc. *Sep 96, p. 56.*
- ★★★/5.2 **LanCD 3.2**, Logicaft, 603/880-0300, \$695 for 10 users. Network CD-ROM client software suffers from difficult setup. *Aug 96, p. 76.*
- ★★/3.1 **LANScape SNMP 2.1**, Sonic Systems, 408/736-1900, \$799. SNMP console sports some sophisticated features, but needs work. *Jul 96, p. 74.*
- ★★★★/7.4 **Navigator 2.0**, Netscape Communications, 415/528-2555, \$49 to \$69. Netscape pushed beyond Web browsing. *May 96, p. 50.*
- ★★★★/7.3 **NetMeter 1.0**, AG Group, 510/937-7900, \$395. Keep tabs on your Ethernet network via sights and sounds. *Jun 96, p. 73.*
- ★★★/5.1 **NewsHopper 1.2**, LandWare, 201/347-0031, \$59. Well-equipped Usenet news reader's competition is free. *Aug 96, p. 69.*
- ★★★/6.9 **PageMill 1.0**, Adobe Systems, 415/961-4400, \$149. Drag-and-drop Web publishing software masks HTML complexities. *Mar 96, p. 56.*
- ★★★/6.5 **SiteMill 1.0.2**, Adobe Systems, 415/961-4400, \$595. Simple Web-site manager is welcome but incomplete. *Jul 96, p. 67.*
- ★★★★/7.3 **StreamWorks 1.0**, Xing Technology, 805/473-0145, free. Netscape plug-in delivers CD-quality audio; no Mac server available. *Jul 96, p. 92.*
- ★★★★/7.2 **Talker 2.0**, MVP Solutions, <http://www.mvpsolutions.c>, free. Text-speech Netscape plug-in uses no more bandwidth than text. *Jul 96, p. 92.*
- ★★★★/7.2 **TeleFinder 5.0**, Spider Island, 714/453-8095, \$675. BBS software understands the Net. *Aug 96, p. 65.*
- ★★★/5.5 **Timbuktu Pro for Networks 2.0**, Farallon, 510/814-5000, \$139 to \$3999. Remote control and file-sharing standby gets a ho-hum upgrade. *May 96, p. 68.*
- ★★★★/7.3 **Voyager 1.0**, Virtus, 919/467-9700, free. VRML browser lets you view 3-D Web sites, but navigation tools are nonintuitive. *Jul 96, p. 92.*

## MEDIA

- ★★★★/7.4 **Adobe Premiere 4.2**, Adobe Systems, 415/961-4400, \$795. Video editor offers significant enhancements. *Mar 96, p. 90.*
- ★★★★/7.1 **Apple Media Tool 2.0**, Apple Computer, 408/996-1010, \$495. Easy for simple interactivity, but advanced features require add-on products. *Aug 96, p. 100.*
- ★★★★/7.1 **Authorware 3.5**, Macromedia, 415/252-2000, \$4995. Authorware offers great features and usability but is very costly. *Aug 96, p. 100.*
- ★★★★/7.1 **Deck II 2.5**, Macromedia, 415/252-2000, \$399. Deck II widens its lead over other software-only multitrack programs. *Jun 96, p. 52.*
- ★★/3.9 **Digital Box Office 1.0**, PowerProduction Software, 310/937-4411, \$599. Combines object- and timeline-oriented authoring, but has an awkward interface. *Aug 96, p. 100.*

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# Star Ratings

- ★★★/6.8 **The Digital Chisel 2.0.1c**, Pierian Springs Software, 503/222-2044, \$99. Strong student-tracking features, but a poor Undo command. *Aug 96, p. 100.*
- ★★★★/7.5 **Digital Performer 1.71**, Mark of the Unicorn, 617/576-2760, \$895. Audio program does an unparalleled job of altering pitch and tempo. *Sep 96, p. 76.*
- ★★★★/7.2 **Director 5.0**, Macromedia, 415/252-2000, \$1195. Multimedia authoring tool gets polish and a performance boost. *Jul 96, p. 52.* **Editors' Choice** for best authoring programs. *Aug 96, p. 100*
- ★★★★/8.3 **Final Effects AP 1.0**, MetaTools, 805/566-6200, \$199. Add cool video effects to Adobe Premiere. *Aug 96, p. 86.*
- ★★★★/7.0 **HyperStudio 3.1**, Roger Wagner Publishing, 619/442-0522, \$199.95. Easy and powerful but weak student-tracking options. *Aug 96, p. 100.* **Editors' Choice** for best authoring programs.
- ★★★★/7.0 **mTropolis 1.0**, mFactory, 415/548-0600, \$4995. Fast and easy to implement most interactivity; but limited text support, and expensive. *Aug 96, p. 100.*
- ★★★/6.8 **Oracle Media Objects 1.0.5.4**, Oracle, 415/506-7000, \$495. Good interface and multiplatform support, but requires too much scripting. *Aug 96, p. 100.*
- ★★★/6.9 **Peak 1.02**, Bias, 415/331-2446, \$299. Digital-audio program combines versatility and power. *Aug 96, p. 60.*
- ★★★★/7.0 **SoundEdit 16 2.0**, Macromedia, 415/252-2000, \$399. Premier Mac sound-editing program just gets better. *Jun 96, p. 52.*
- ★★★★/7.0 **Special Delivery 2.1**, Interactive Media, 415/948-0745, \$259. Easy to use, but lacks hypertext. *Aug 96, p. 100.* **Editors' Choice** for best authoring software.
- ★★★★/7.2 **Studio Vision Pro 3.0.3**, Opcode Systems, 415/856-3333, \$895. For MIDI-audio conversion, this audio program is the one to buy. *Sep 96, p. 76.*
- ★★★★/7.1 **SuperCard 2.5.2**, Allegiant Technologies, 619/587-0500, \$595. Superb resource-management and interface support, but can be sluggish. *Aug 96, p. 100.* **Editors' Choice** for best authoring software.

## PRODUCTIVITY

- ★★★★/5.1 **ACT for Macintosh 2.5.1**, Symantec, 541/334-6054, \$169.95. A weak offering in the field of PIM software. *Jul 96, p. 62.*
- ★★/4.8 **ACT for Newton 1.0**, Symantec, 541/334-6054, \$99.95. Only die-hard fans of the desktop version could love this portable PIM. *Jul 96, p. 62.*
- ★★★/6.8 **Claris Organizer 1.0**, Claris, 408/987-7000, \$49 (estimated). Simple little PIM is fast, easy to learn, and intelligently designed. *Jun 96, p. 106.*
- ★★★/6.9 **DateBook Pro 4.2**, Now Software, 503/274-2800, \$69.95 (estimated). A well-designed but often sluggish calendar and scheduling program. *Jun 96, p. 106.*
- ★★★/5.2 **Full Contact 3.0**, Pitch Software, 408/374-5504, \$199. Resurrected PIM has been improved—but not enough. *Jun 96, p. 70.*
- ★★★★/7.0 **In Control 4.0**, Attain, 617/776-1110, \$85. Outline-based PIM adds Net links. *Aug 96, p. 63.*

- ★★★/6.9 **InTouch 2.5.2**, Prairie Group, 515/225-3720, \$49.95. Simple contact manager doesn't force you to plug information into designated slots. *Jun 96, p. 106.*
- ★★★★/8.3 **Quicken Deluxe 6**, Intuit, 520/295-3220, \$59.99. The best-selling package gets bigger and mostly better. *Feb 96, p. 65.*
- ★★★/6.8 **TouchBase Pro 4.2**, Now Software, 503/274-2800, \$69.95 (estimated). Slow, but offers up to 16 custom fields. *Jun 96, p. 106.*
- ★★★★/7.1 **WebArranger 2.0**, CE Software, 515/221-1801, \$99.95. Resurrected PIM offers strong suite of Internet tools. *Aug 96, p. 63.*
- ★★★★/8.1 **WillMaker 6.0**, Nolo Press, 510/549-1976, \$69.95. Commonsense legal guide makes writing your will easy. *Aug 96, p. 80.*

## UTILITIES

- ★★★/5.3 **Adobe File Utilities 1.0**, Adobe Systems, 415/961-4400, \$149. Mac utilities work well but are unnecessary for many Mac users. *Aug 96, p. 62.*
- ★★★★/9.4 **Conflict Catcher 3.0.1**, Casady & Greene, 408/484-9228, \$99.95. The perfect tool for managing extensions. *Jun 96, p. 106.*
- ★★★★/8.2 **Here & Now 2.0**, Software Architects, 206/497-0122, \$75. The best choice for helping Win95 files work with the Mac. *Sep 96, p. 60.*
- ★★★/5.4 **KeyQuencer**, available online, shareware. Relatively powerful shareware macro program. *Jun 96, p. 106.*
- ★★★/5.6 **LaserMerge Electronic Paper 2.0**, MindGate Technologies, 615/937-6800, \$95. Souped-up printing utility multiplies your output options. *Sep 96, p. 87.*
- ★★★/5.9 **Mac Drive 95 1.0**, Media4, 515/225-7409, \$60. Acceptable, if inelegant, file sharing with Windows 95. *Sep 96, p. 60.*
- ★★★/6.7 **MacOpener 2.0**, DataViz, 203/268-0030, \$50. File-transfer utility's reliance on DOS extensions is disappointing. *Sep 96, p. 60.*
- ★★★/6.7 **MacTools Pro 4.0**, Symantec, 541/334-6054, \$149.95. A respectable troubleshooting and data-recovery program for a reasonable price. *Jun 96, p. 106.*
- ★★★/6.8 **MacTransfer 1.0**, Insignia Solutions, 408/327-6000, \$55. A solid choice for cross-platform file exchanges. *Sep 96, p. 60.*
- ★★★/6.8 **Norton Utilities 3.2**, Symantec, 541/334-6054, \$149.95. Easy-to-use tool kit works wonders. *Jun 96, p. 106.*
- ★★★/6.4 **Now Utilities 6.0**, Now Software, 503/274-2800, \$89.95. A good collection of utilities, but a mediocre upgrade. *Aug 96, p. 59.*
- ★★★/5.1 **OneClick 1.0.1**, Westcode, 619/487-9200, \$129. Promising button-based macro utility needs fine-tuning. *May 96, p. 67.*
- ★★★★/7.4 **QuickKeys 3.0.1**, CE Software, 515/221-1801, \$119. Hands-down winner for an easy way to automate repetitive tasks. *Jun 96, p. 106.*
- ★★★★/8.6 **RAM Doubler 1.6**, Connectix, 415/571-5100, \$99. Fools your Mac into thinking it has twice the RAM it actually does. *Apr 96, p. 102.*
- ★★★/5.7 **SAM 4.0.8**, Symantec, 541/334-6054, \$69. SAM finds viruses, kills 'em. *Jul 96, p. 72.*
- ★★★★/8.9 **Speed Doubler 1.0.2**, Connectix, 415/571-5100, \$99. Connectix makes a Power Mac's 680X0 emulation feel native. *Feb 96, p. 56.*
- ★★★/6.9 **Tempo II Plus 3.0.9**, Affinity Microsystems, 303/442-4840, \$179.95. Powerful macro program suffers from undue complexity. *Jun 96, p. 106.*
- ★★★/5.1 **TransferPro 1.0**, Digital Instrumentation Technology, 505/662-1459, \$189. File-transfer

capabilities need to work better in the Windows 95 world. *Sep 96, p. 60.*

- ★★/3.7 **XChange 1.2**, Optima Technologies, 714/476-0515, \$49. Cross-platform transfer capabilities are a buggy disappointment. *Sep 96, p. 60.*

## h a r d w a r e

### CD-R DRIVES

- ★★★/6.9 **APS CDR 2x4**, APS Technologies, 816/483-6100, \$900. This 2x CD-R drive offers average performance at a good price. *Sep 96, p. 132.*
- ★★★/6.5 **CD-R 1002**, Smart and Friendly, 818/772-8001, \$899. This 2x CD-R drive is a decent performer. *Sep 96, p. 132.*
- ★★★/6.4 **CDD2000**, Philips Electronics, 408/453-5129, \$1035. Reasonably priced 2x CD-R drive, but no support for many formats. *Sep 96, p. 132.*
- ★★★/6.8 **CDM240**, DynaTek Automation Systems, 902/832-3000, \$999. This 2x-write/4x-read CD-R drive's fast read is of limited value in a drive built primarily for writing. *Sep 96, p. 132.*
- ★★★/7.2 **CDM400**, DynaTek Automation Systems, 902/832-3000, \$1199. Low-cost 4x CD-R drive, with no sacrifices in software, features, or performance. *Sep 96, p. 132.* **Editors' Choice** for best CD recorders.
- ★★★/7.2 **DCDR-100**, Direct Connections, 612/937-6283, \$1195. This 4x CD-R drive came with our favorite premastering software. *Sep 96, p. 132.* **Editors' Choice** for best CD recorders.
- ★★/4.9 **DisKovery 650CDR**, Optima Technology, 714/476-0515, \$1395. QuickTopix software is the pits, and drive's price tag is too high. *Sep 96, p. 132.*
- ★★★/6.2 **HammerCD-R 2x**, FWB, 415/325-4392, \$1400. Solid construction and robust software bundle are pluses, but 2x CD-R is pricey. *Sep 96, p. 132.*
- ★★★/5.6 **Master CD Plus**, MicroNet Technology, 714/453-6100, \$1195. CD-R drive gives 2x performance at a 4x price. *Sep 96, p. 132.*
- ★★★/6.6 **Master CD Pro**, MicroNet Technology, 714/453-6100, \$1895. CD-R drive performs as well as other 4x units, but has exorbitant price tag. *Sep 96, p. 132.*
- ★★/4.4 **PlayWrite 2000**, Microboards, 612/470-1848, \$1195. Poor software, cheap SCSI cable, no terminator, and expensive 2x CD-R drive. *Sep 96, p. 132.*

### MISCELLANEOUS HARDWARE

- ★★★/6.4 **Alps Adjustable Mouse**, Alps Electric, 408/432-6000, \$39.95. Mouse's movable shell tilts for optimum angle. *Sep 96, p. 98.*
- ★★★/5.1 **Apple Color OneScanner 600/27**, Apple Computer, 408/996-1010, \$629. This new version has little to offer. *Jul 96, p. 54.*
- ★★★★/7.0 **Apple MessagePad 130**, Apple Computer, 408/996-1010, \$695. Apple adds backlighting to the Newton. *Aug 96, p. 78.*
- ★★★/6.5 **Color QuickCam 1.0**, Connectix, 415/571-5100, \$299. Low-cost camera for passable digital video. *Sep 96, p. 79.*
- ★★/4.6 **Fujix DS-220**, Fuji, 914/789-8100, \$1200. Digital camera misses the mark. *Sep 96, p. 85.*
- ★★★/5.3 **GyroPoint Desk 1.0**, Gyration, 408/255-3016, \$149. Mouse works on or off the desk. *Jul 96, p. 76.*
- ★★★/6.3 **HP ScanJet 4p**, Hewlett-Packard, 408/246-

*continues*



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# Star Ratings

4300, \$615. High price and slow scan times make the ScanJet 4p scanner a mediocre choice. *Jul 96, p. 54.*

★★★/6.8 **Kodak Digital Science DC50 Zoom Camera**, Eastman Kodak, 716/724-4000, \$1000. Camera combines zoom and autofocus with good color and detail. *Jul 96, p. 57.*

★★/4.2 **MagicLink PIC-2000**, Sony, 408/432-1600, \$899. PDA has readable screen and built-in modem but it's too large. *Jul 96, p. 102.*

★★★/6.2 **Mouse-Trak**, Itac Systems, 214/494-3073, \$179. Well-built trackball with good ball dynamics. *May 96, p. 98.* **Editors' Choice** for best input devices.

★★★/6.6 **PageOffice**, Umax Technologies, 510/651-4000, \$349. Personal page scanner shortchanges Mac users. *Jun 96, p. 58.*

★★★★/7.8 **Polaroid PDC-2000**, Polaroid, 716/256-4436 ext. 868, \$3695 as tested. New breed of camera creates output as cool as its hardware. *Aug 96, p. 52.*

★★★/5.1 **PowerShop**, Adaptive Solutions, 503/690-1236, \$2000 (estimated). Worth considering if its few accelerated tasks are among those you perform regularly. *Jun 96, p. 87.* **Editors' Choice** for best Photoshop systems hardware.

★★/4.2 **Psion Series 3a**, Psion, 508/371-0310, \$595. PDA has good software but an awkward L-shape when open. *Jul 96, p. 102.*

★★★★/7.0 **QuePoint II**, MicroQue, 801/263-1883, \$74.95. Excellent touchpad with customizable application settings. *May 96, p. 98.* **Editors' Choice** for best input devices.

★★★★/7.1 **QuickTime Conferencing Kit 1.0**, Apple Computer, 408/996-1010, \$2000. Good value, straightforward LAN- and ISDN-capable software. *May 96, p. 82.*

★★★★/7.4 **Thinking Mouse 5.0**, Kensington Micro-ware, 415/572-2700, \$89.99. Four-button mouse with excellent ergonomics and software. *May 96, p. 98.* **Editors' Choice** for best input devices.

★★★★/8.4 **Umax Vista-S6E**, Umax Technologies, 510/651-4000, \$445. A clear best buy for anyone seeking a quality desktop scanner. *Jul 96, p. 54.*

★★/4.8 **Zaurus ZR-5000**, Sharp, 201/529-8200, \$499. Easy-to-carry PDA offers decent graphics tools, but no handwriting recognition. *Jul 96, p. 102.*

## MODEMS/NETWORK

★★★/6.3 **28.8 CruiseCard**, Megahertz, 801/320-7000, \$299. Economical PC Card modem with good performance but low connect (reliability) rates. *Jul 96, p. 141.*

★★/4.8 **Communicard 28.8**, Dayna Communications, 801/269-7200, \$359 to \$416 (estimated). Expensive PC Card modem, without digital line protection frequently found in similar cards. *Jul 96, p. 141.*

★★★/6.0 **DF2814**, TDK Systems, 916/478-8421, \$379. Low price and five-year warranty, but PC Card modem was bogged down by JPEG file transfer. *Jul 96, p. 141.*

★★★/5.4 **EFM 288XJ**, Epson America, 310/782-0770, \$299. Fast PC Card modem, but with a low call-connect (reliability) score. *Jul 96, p. 141.*

★★★/6.2 **Mac Class 288 V.34**, Practical Peripherals, 770/840-9966, \$299. PC card modem has acceptable performance with a nice price. *Jul 96, p. 141.*

★★★/5.4 **Mobile Plus Macintosh**, Apex Data, 510/623-1231, \$307. PC card modem has a long five-

year warranty, but not much else. *Jul 96, p. 141.*

★★★★/8.6 **Netopia 440**, Farallon, 510/814-5000, \$1475. ISDN router has Mac-centric features so easy to set up and maintain. *Sep 96, p. 68.*

★★★/6.6 **Optima 288 V.34**, Hayes Microcomputer Products, 770/441-1617, \$319. PC card modem is an excellent performer with a great price and warranty. *Jul 96, p. 141.*

★★★/6.9 **Pacesetter**, ADC Kentrox, 503/643-1681, \$1199. Versatile, easy-to-configure router for ISDN or frame-relay connections. *Sep 96, p. 70.*

★★★/6.8 **Pipeline 25**, Ascend Communications, 510/769-6001, \$895 to \$1495. ISDN router with analog ports is useful for home offices. *Sep 96, p. 68.*

★★★★/7.1 **Pipeline 50**, Ascend Communications, 510/769-6001, \$1695. ISDN router has IP routing and multiprotocol bridging. *Sep 96, p. 68.*

★★★/5.9 **Pipeline 130**, Ascend Communications, 510/769-6001, \$1995. Router supports ISDN or frame-relay connections. *Sep 96, p. 70.*

★★★★/8.0 **PowerPort Platinum PC Card**, Global Village Communication, 408/523-1000, \$399 (list). A complete, well-conceived mobile communications package for the Macintosh. *Jul 96, p. 141.* **Editors' Choice** for best PC card modems.

★★★/5.4 **SafeJack**, Angia Communications, 801/371-0488, \$299. Lifetime warranty for this PC card modem, but no bundled software. *Jul 96, p. 141.*

★★/4.3 **SmartLink V.34 2834 PCA**, Archtek America, 818/912-9800, \$349. PC card modem has no Mac documentation. *Jul 96, p. 141.*

★/2.6 **Smart One 2834VLXMac**, Best Data Products, 818/773-9600, \$269. This voice modem is not a smart choice. *Jun 96, p. 76.*

## PRINTERS

★★★/5.7 **4039 10plus**, Lexmark, 606/232-2000, \$1249. Fast on text, but low Postscript emulation; high-quality output; expensive. *Sep 96, p. 181.*

★★★/6.9 **Apple Color StyleWriter 1500**, Apple Computer, 408/996-1010, \$289. Low-cost color ink-jet offers a bargain-priced option. *Jul 96, p. 59.*

★★★★/7.5 **Apple Color StyleWriter 2500**, Apple Computer, 408/996-1010, \$389. Color ink-jet has quality and speed for small-office users. *Jul 96, p. 59.*

★★★★/7.1 **Canon BJC-4100**, Canon Computer Systems, 714/438-3000, \$399. Excellent print quality and can be used with a PC. *Apr 96, p. 133.* **Editors' Choice** for best midrange color ink-jet printers.

★★★★/7.2 **Epson Stylus Pro**, Epson America, 310/782-0770, \$999. Top-notch 720-dpi output, sprightly performance; a bargain alternative to dye-sub printers. *Apr 96, p. 133.* **Editors' Choice** for best high-end color ink-jet printers.

★★★/5.9 **HP LaserJet 5M**, Hewlett-Packard, 408/246-4300, \$2229. A good workgroup printer gets better. *Jul 96, p. 56.*

★★★★/7.1 **HP LaserJet 5MP**, Hewlett-Packard, 408/246-4300, \$1299. Consistently quick performance and high-quality output. *Sep 96, p. 181.* **Editors' Choice** for best personal laser printers.

★★★/6.5 **HP LaserJet 5Si MX**, Hewlett-Packard, 408/246-4300, \$4899. Pricy, but offers top speed and quality. *Jun 96, p. 116.* **Editors' Choice** for best workgroup printers.

★★★/5.6 **LaserWriter 4/600 PS**, Apple Computer, 408/996-1010, \$929 (estimated). Slow but good text and adequate graphics output. *Sep 96, p. 181.*

★★★/6.5 **microLaser Pro/8**, Texas Instruments, 800/848-3927, \$1299. Speedy performance, but poor-quality graphics output. *Sep 96, p. 181.*

★★/4.9 **OL610e/PS**, Okidata, 609/235-2600, \$949.

Middling performance; poor text and graphics output quality. *Sep 96, p. 181.*

★★★/6.1 **OL810e/PS**, Okidata, 609/235-2600, \$1439. Quick performance; excellent text but poor graphics output. *Sep 96, p. 181.*

★★/4.3 **Personal LaserWriter 300**, Apple Computer, 408/996-1010, \$652 (estimated). Slow performance, grainy output, low price. *Sep 96, p. 181.*

## STORAGE

★★/4.9 **3200**, Seagate, 714/252-7800, \$339. The price is right, but this drive unfortunately uses the noisy, slow Travan technology. *Aug 96, p. 143.*

★★/4.3 **Blue Stream DAT**, Microtech, 203/468-6223, \$1399. Average performance, average price. *Aug 96, p. 143.*

★★/4.6 **DAT 8-OSSD**, Dynatek, 902/832-3000, \$1099. A disappointment among DAT drives for both its price and performance. *Aug 96, p. 143.*

★★★★/7.4 **DC DLT 4000**, Direct Connections, 612/937-9771, \$3495. The top DLT drive in price, performance, and warranty. *Aug 96, p. 143.* **Editors' Choice** for best tape-backup system.

★★★/6.6 **DC SDT 7000**, Direct Connections, 612/937-9771, \$999. The top DAT drive for performance, price, and warranty. *Aug 96, p. 143.* **Editors' Choice** for best tape-backup system.

★★★★/6.5 **DLT30**, APS Technologies, 816/483-6100, \$4000. A top performer in the DLT field, but priced high. *Aug 96, p. 143.*

★★/4.4 **EXB-8505XL**, Exabyte, 303/442-4333, \$1595. A disappointing performance from an internal 8mm drive. *Aug 96, p. 143.*

★★/4.9 **EXB-8700**, Exabyte, 303/442-4333, \$1995. A disappointing performance from an external 8mm drive. *Aug 96, p. 143.*

★★/4.7 **HammerDAT 8000**, FWB, 415/325-4392, \$1429. A middling performer among the DAT drives tested. *Aug 96, p. 143.*

★★★/5.9 **HammerDLT 20G**, FWB, 415/325-4392, \$5999. A top performer in both large-file and large-folder backup, hampered by its high price. *Aug 96, p. 143.*

★★★★/5.9 **HyperDAT Pro**, APS Technologies, 816/483-6100, \$1100. Uses the same mechanism as the Editor's Choice, but more expensive. *Aug 96, p. 143.*

★★★★/8.3 **Jaz Drive**, Iomega, 801/778-1000, \$599.95. Iomega thinks big with Zip's new sibling. *Jun 96, p. 48.*

★★/4.6 **Mac 2616 QWCX**, MegaHaus, 713/534-3919, \$469. Relatively inexpensive unit is based on the slow Travan mechanism. *Aug 96, p. 143.*

★★★/5.5 **Mac 8 616HPX**, MegaHaus, 713/534-3919, \$1079. The least-expensive DAT drive, with average performance results. *Aug 96, p. 143.*

★★/3.4 **PD DAT 4000**, ProDirect, 612/941-1805, \$900. A little on the slow side, but a bargain when it comes to price. *Aug 96, p. 143.*

★★★/6.0 **Premier DLT**, MicroNet Technology, 714/453-6000, \$7115. A top-performing DLT drive in all tests, but talk about sticker shock. *Aug 96, p. 143.*

★★★★/7.0 **Quantum DLT 2000XT**, Quantum, 408/894-4000, \$4200. A good performer with large folders, but not with large files. *Aug 96, p. 143.*

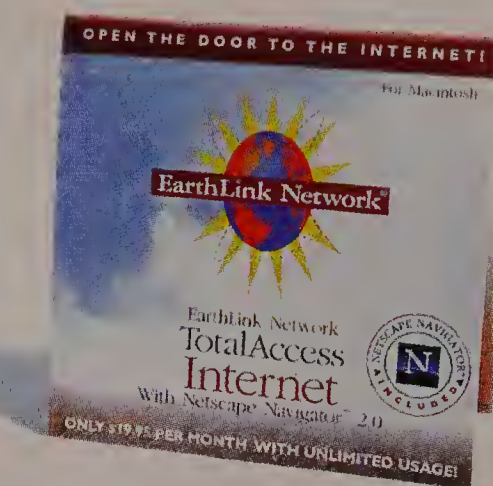
★★/4.2 **SureStore Tape 6000e**, Hewlett-Packard, 970/669-8000, \$1300. A more expensive DAT drive, with average performance. *Aug 96, p. 143.*

## SYSTEMS

★★★★/8.1 **Apple Network Server 700**, Apple Com-  
*continues*



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# Star Ratings

puter, 408/996-1010, \$12,500. Stunningly fast and brutally robust tower system. Sep 96, p. 75.

★★★★/7.0 **Genesis MP 528**, DayStar Digital, 707/967-2077, \$9999. For extensive Photoshop work, this system may be worth its high price. Jul 96, p. 84.

★★★★/7.3 **Nupowr for PowerBook 500 series**, Newer Technology, 316/943-0222, \$745. Solid path to PowerPC for 500-series notebooks. Aug 96, p. 54.

★★★★/5.5 **OrangePC 440**, Orange Micro, 714/779-2772, \$1347. Cards come on strong; SoftWindows is still slow. Sep 96, p. 58.

★★★★/7.6 **PowerBook 500 PowerPC Upgrade**, Apple Computer, 408/996-1010, \$769 with 8MB of RAM. Solid path to PowerPC for 500-series notebooks. Aug 96, p. 54.

★★★★/6.3 **PowerCenter 120**, Power Computing, 512/388-6886, \$1995. The cheapest fast desktop Mac outdoes 7500/120 in price, and is near enough in speed. Jul 96, p. 84.

★★★★/5.9 **PowerCenter 120 Low Profile**, Power Computing, 512/388-6886, \$1895. Sytem's low-profile case really limits internal-drive expansion. Jul 96, p. 84.

★★★★/7.1 **PowerCenter 132**, Power Computing, 512/388-6886, \$2495. The desktop Mac to get if you want to shave some costs. Jul 96, p. 84.

★★★★/7.3 **PowerCenter 150**, Power Computing, 512/388-6886, \$2995. The best desktop choice—

and fairly inexpensive to boot. Jul 96, p. 84. **Editors' Choice** for best business user's system.

★★★/4.3 **Power Mac 7200/120 PC Compatible**, Apple Computer, 408/996-1010, \$2799. Cards come on strong; SoftWindows is still slow. Sep 96, p. 58.

★★★/4.6 **Power Macintosh 7200/120**, Apple Computer, 408/996-1010, \$2299. System is not cheap enough, and will cost too much to upgrade. Jul 96, p. 84.

★★★★/5.8 **Power Macintosh 7600/120**, Apple Computer, 408/996-1010, \$2999. Apple's new flagship desktop Mac doesn't go far enough in performance. Jul 96, p. 84.

★★★★/5.8 **Power Macintosh 8500/132**, Apple Computer, 408/996-1010, \$3899. For a moderate drop in performance, but a big price break, this system is still just for AV users. Jul 96, p. 84.

★★★★/6.0 **Power Macintosh 8500/150**, Apple Computer, 408/996-1010, \$4699. AV professionals will continue to like the 8500, despite its hard-to-upgrade design and high price. Jul 96, p. 84.

★★★★/5.6 **Power Macintosh 9500/150**, Apple Computer, 408/996-1010, \$4799. Pricy but fast; the 9500/150's real advantages are its six PCI slots. Jul 96, p. 84.

★★★★/7.1 **PowerTower 166**, Power Computing, 512/388-6886, \$3795. Comparable to a Power Mac 8500/150, the PowerTower 166 is cheaper but lacks AV features. Jul 96, p. 84.

★★★★/7.3 **PowerTower 180**, Power Computing, 512/388-6886, \$4195. The top Mac performer, this tower also offers a good price and sufficient expansion. Jul 96, p. 84. **Editors' Choice** for best power user's system.

## VIDEO/DISPLAY

★★★★/7.8 **ATI Xclaim GA**, ATI Technologies, 905/882-2600, \$449. Adequate video-display acceleration and super-fast FreeHand previews at a low price. Jun 96, p. 93.

★★★★/6.9 **Diamond Javelin Video 3400XL**, Diamond Multimedia, 408/325-7000, \$469. Decent video acceleration. Jun 96, p. 93.

★★★★/6.8 **IMS TwinTurbo-128M**, Integrated Micro Solutions, 408/369-8282, \$699. Slight screen-refresh artifacts detract from good video-acceleration speeds. Jun 96, p. 93.

★★★★/7.1 **MagnaByte M3xv**, Telex, 612/884-4051, \$3995. Easy to use, good image quality, mid-range price. May 96, p. 139. **Editors' Choice** for best LCD projection panels.

★/2.8 **Matrox MGA Millennium**, Matrox, 514/969-6320, \$649. Accelerator has major flaws. Jun 96, p. 93.

★★★★/6.8 **MultiSync M500**, NEC, 508/264-8000, \$599. Multimedia monitor has a top-notch picture and decent sound. Jul 96, p. 69.

★★★★/8.3 **Number Nine Imagine 128**, Number Nine Visual Technology, 617/674-0009, \$999. Fastest overall video acceleration of the PCI cards we reviewed, at a relatively high cost. Jun 96, p. 93.

★★/3.5 **Radius Thunder 30/1600**, Radius, 408/541-6100, \$1499. PCI video-display card with solid performance, but FreeHand problems. Jun 96, p. 93.

★★★★/7.2 **Rainbow 30/10**, Chisholm, 408/559-1111, \$4995. Panel is carefully designed for ease of use; a good value. May 96, p. 139. **Editors' Choice** for best LCD projection panels. **m**

## Little known Mac fact #9

You can use your PC files from the office on your Mac at home.



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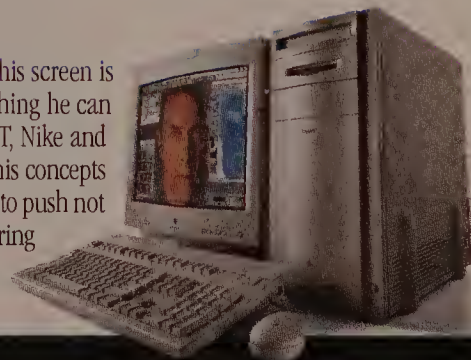
*where it came from. Or where it's going.*  
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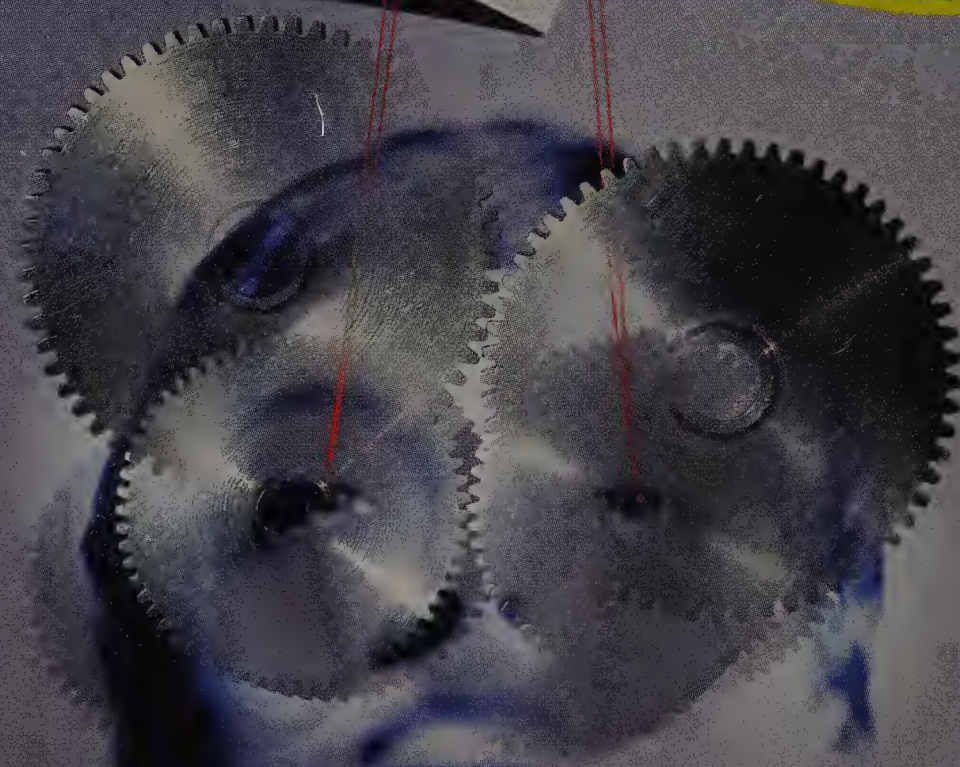
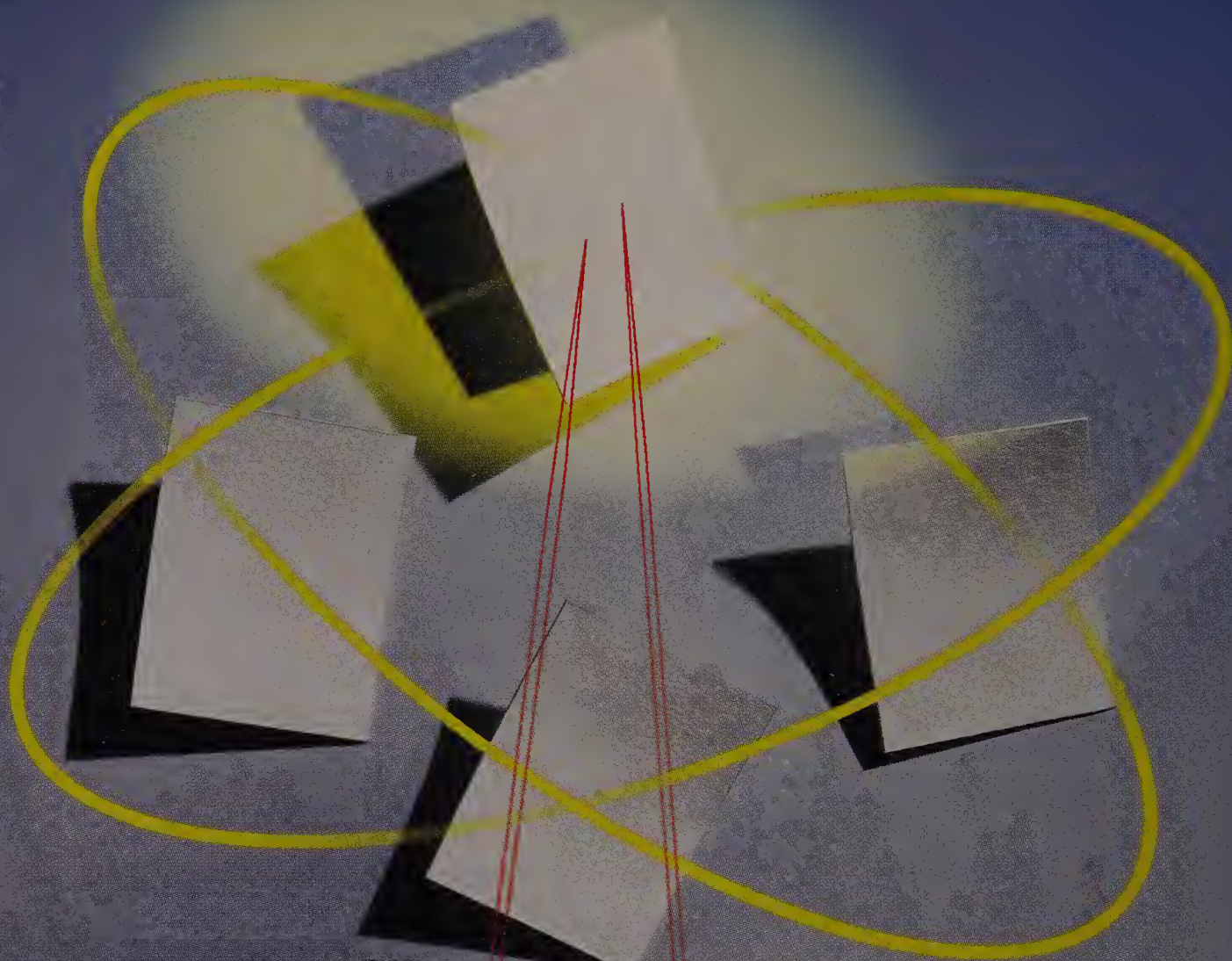
Inspiration happens. In David Carson's case, inspiration happens a lot. Fortunately for David, what he sees on his screen is never very far from what he sees in his mind. Power Macintosh® computers help him explore just about anything he can imagine. His groundbreaking design work for *Surfer* and *Ray Gun* magazines—as well as for clients like AT&T, Nike and Pepsi—confirms it. But the Power Mac™ is also flexible enough to change when David's ideas do. So he can take his concepts and easily reexpress them in new mediums—from film to the Internet. It's the kind of freedom that allows him to push not only the limits of his computer, but the limits of his creativity. Authoring web sites. Manipulating graphics. Altering video. It's never been easier for David to create the work he's known for: the kind that never existed before.



To find out more about our cross-media authoring solutions, visit us at [www.masters.media.apple.com](http://www.masters.media.apple.com) or call 800-305-0374 for information via fax.









# ENERGIZE

Ever-changing online content keeps visitors coming back again and again **by Mel Beckman**

# YOUR

# WEB SITE

WEB PUBLISHING HAS ONE ASPECT with no parallel in the paper world: dynamic content. To be a successful Web author, you not only must deliver the goods to your readers, but you must deliver new and different goods on a regular basis. What keeps a user coming back to your site is the sense that each visit will turn up new treasures. The challenge is to provide ever-changing (and useful) content while maintaining your Web site's design integrity. You must also construct your site so that users can interact with it and get the information they want. Let's look at the different ways you can do this and the software tools that will help you bring your site to life. Combine these tools with the Web-authoring software described in the companion feature "Web Authoring's New Tools," and you've got the essentials to build a killer site.



**CGI: Gateway to Glitz**

A dynamic Web page delivers varying content depending on who the user is, the user's Web browser, and the way the user interacts with the site.

"Click here for JPEG version" is rude; dynamic sites know what your

whatever it takes to keep the user engaged and coming back.

Common Gateway Interface (CGI) programming is the key for this kind of flexibility, and it's the underlying mechanism for every dynamic Web capability. CGI connects your static HTML docu-

user's client is just an ordinary Web browser.

Because CGI is a standard (currently part of HTML 2.0) across Web-serving platforms, you're not restricted to running CGI scripts just from your Macintosh server. With the right tools, you can run scripts and access data from Unix- and Windows-based servers—flexibility that lets you have the best of all worlds when building complex sites.

CGI has three components.

- The *user's browser* makes a CGI request through a special URL (Uniform Resource Locator). The user can type this URL directly, but it is more likely to be embedded in a hot link in one of your HTML documents.

- On the Mac, the *CGI-capable Web server* could be Quarterdeck/StarNine's WebStar or MacHTTP, InterCon's InterServer Publisher, or Tenon's MachTen (see "Internet Essentials: Get On the Web," *Macworld*, April 1996).

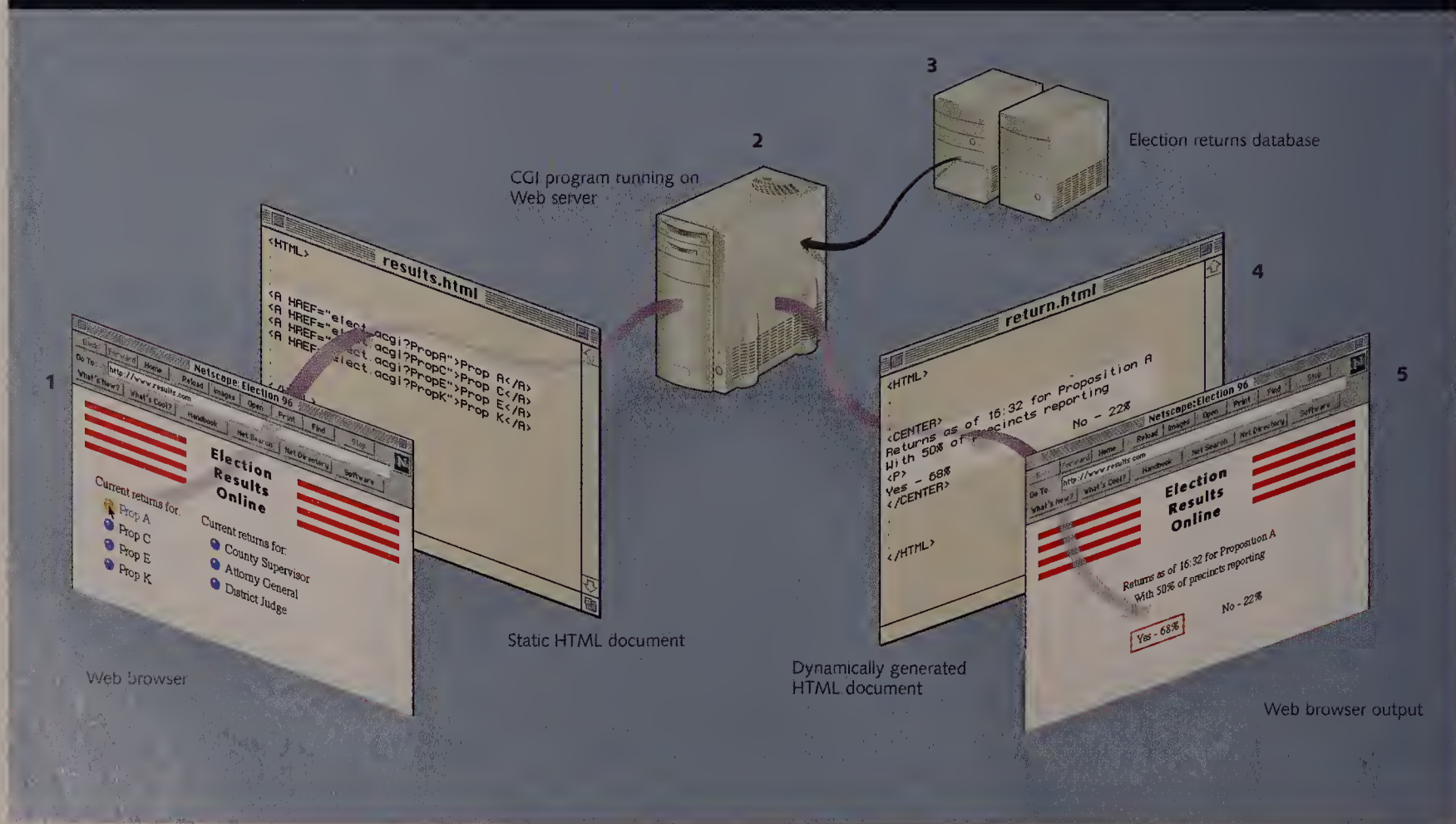
## Preprocessors help solve one of the most frustrating problems facing Web authors

browser can handle and deliver it automatically. A bare-bones page lets you post E-mail; a turbocharged one draws you into discussions with other users. A dead site takes your order and says good-bye; a hip one says, "Hi, Bob. Your order is scheduled to ship next Thursday." A dynamic Web page can access information from local Macintosh applications and data files, external databases, and even remote non-Macintosh computers—

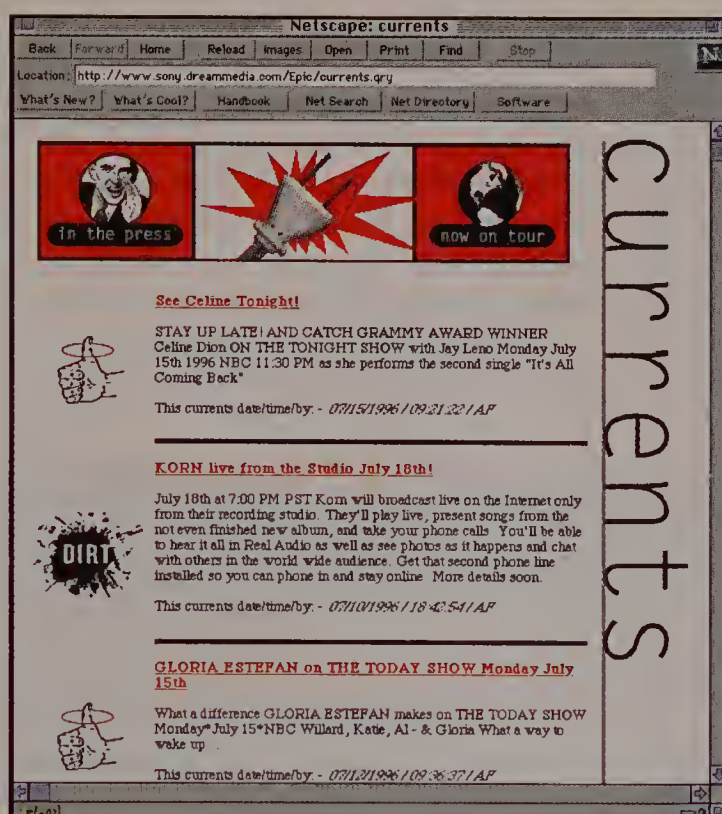
ments to programs or scripts that create their own HTML text on the fly, which the user's browser then displays just as if it had come from an HTML file. CGI programs can receive input from the user, as well as information about the user's environment, and then construct appropriate HTML to display whatever you want (see the diagram, "How CGIs Customize What You See on the Web"). All this happens on your Web server—the

### How CGIs Customize What You See on the Web

1. CGI processing begins when a user clicks on a hot link or submits a form, invoking a CGI program—for example, a user requesting election results for a proposition. 2. The Web server receives the request, recognizes it as requiring a CGI program, and launches the CGI, passing along any information the user supplies, usually in a form. 3. When the CGI program gets control, it parses the user input, determines what the user is requesting, and consults various data sources, such as local or remote files, database sources, or other applications. 4. The CGI program then uses the information it has retrieved to construct a reply HTML document—one built specifically to respond to the user's request. The CGI program passes this document back to the user's browser through the server. 5. The result is a custom Web page on the user's screen, tailored to meet that user's needs.







**FAST UPDATES** Sony Music Entertainment's Epic Records uses EveryWare's Tango to manage the data, including music clips, for its Stream music E-zine (<http://www.sony.dreammedia.com>). The site's architect, DreamMedia, designed the 3000-plus-page site so that record-company staffers could update it via Netscape Navigator forms, such as the one shown here (left) for the news section. They just type in the headline, body text, and appropriate URL; pick an icon from a pull-down menu; and save the record. Tango automatically generates the HTML and hot links when a visitor accesses the page (right).

- The CGI application can be written in virtually any programming language. You can buy commercial CGI applications that carry out a specific task, such as forms processing, or write your own in a scripting language, such as AppleScript or MacPerl. The Web server identifies an URL invoking a CGI program either by its path (by convention, /cgi-bin/) or by the file extension (usually .cgi or .acgi).

### The Active Page

HTML preprocessing is an easy way to add intelligence to HTML. When invoked via an URL, a special CGI program—the *preprocessor*—reads existing HTML text files and interprets special embedded commands to create new HTML on the spot. Preprocessor commands let you conditionally control which HTML actually gets sent to the browser. Because the HTML page itself directs the operations the server will perform, such pages are called *active pages*. Preprocessing helps solve one of the most frustrating problems facing Web authors: making your Web site compatible with the multitude of Web browsers.

Maxum Development's NetCloak 2.0.1 (\$195; <http://www.maxum.com>) is an HTML preprocessor that adds 30 commands to those you normally use in HTML documents. When NetCloak preprocesses your HTML, it notes—from a user's initial request—the type of browser the user is running and the user's IP address. NetCloak interprets the enhanced HTML commands just before

sending an HTML document to the client browser. This lets you substitute HTML for less-capable browsers, insert time-and-date stamps, deliver JPEG or other file formats only when appropriate, and limit which portions of a document users see based on the client's Internet address or domain name.

Tim Endres has developed a similar preprocessor, called MacHTPL 2.2.2 (free; <http://www.ice.com>), for Macintosh HyperText Programming Language. MacHTPL can do most of the things NetCloak does, but it has more of the flavor of a real programming language, with variable definition and substitution, expression evaluation, conditional and iterative structures, and built-in forms-processing aids. In addition to helping you tailor your HTML for specific browsers, MacHTPL can dynamically generate tables, perform arithmetic calculations, and make logical decisions based on user input from forms.

While NetCloak makes simple HTML tailoring easy, its limited command set isn't up to complex tasks such as reformatting data into a variably sized table or constructing forms on the fly. MacHTPL is worth learning if you plan to do more than basic page tailoring.

### Interacting Forms

While HTML preprocessing lets you make your Web site more responsive to user needs, another class of prebuilt CGIs lets users respond to your Web site via fill-out forms. Forms are the graphical

user interface of the Web; they let you interact with users through text boxes, radio buttons, check boxes, pop-up menus, and other dialog tools.

Unfortunately, while HTML provides everything you need to create a form, it provides nothing for processing the user's input. For that you must use a forms-specific CGI program. Two such programs are Maxum's NetForms 2.0 (\$195) and Terje Norderhaug's shareware Interaction/IP (I tested beta version 0.87) from Media Design inProgress (\$200; <http://www.ifi.uio.no/~terjen/interaction>).

Both applications work with forms you construct, accepting user input and archiving it in Macintosh disk files. Applications for this kind of forms processing include recording user feedback, online product registration, problem reporting and tracking, and online order taking. You can optionally trigger other Mac CGI applications to process the information stored by either NetForms or Interaction/IP. When the CGI application processes a user's input for archiving, you can reformat the data any way you wish, including embedding custom HTML and even hot links. For example, an archived form could contain an HTML table or links to related forms. When another user retrieves the archived form, the embedded HTML formats the contents for display.

Both products show off their abilities by including a ready-made user discussion forum application that lets users post message forms into BBS-like message archives. Hot links embedded in the



archived forms let you go to previous and subsequent messages in a group or thread.

While both products are simple to install and use, only Interaction/IP is extendable, coming with a variety of plug-in modules and tool scripts. For example, one plug-in module provides a collaborative calculator that multiple users can access to solve a math problem jointly.

NetForms and Interaction/IP can process forms and archive the results in

Tango (\$495) is a CGI program that forwards SQL queries to Butler SQL (or any ODBC-compatible SQL database running under Windows or Unix) and reformats the responses into HTML for a customized display. (For information about Tango for FileMaker Pro, see *Reviews*, elsewhere in this issue.)

Along with the CGI application, you also get a query-definition editor that lets you define HTML snippets for a user's

In addition to database queries, Tango automatically generates forms for maintaining database records, giving you the ability to retrieve an individual record, change its contents, and update it back in the database.

The Butler-Tango combo is easy to use for building small databases and standard queries. The Butler database tools, however, are cumbersome for building and managing large databases containing many tables, largely due to the tools' inability to display relationships between tables graphically. And while Tango's query-definition editor automatically generates simple HTML forms, you must know and understand HTML if you want to enhance the generated HTML. For example, adding a hot link to each table entry requires manually inserting an **HRef** anchor tag in the correct place within the query-output HTML snippet. Despite these difficulties, Tango with Butler SQL simplifies making Web-enabled database-query and -update applications.

## None of the tools I tried were even close to usable for real-world applications

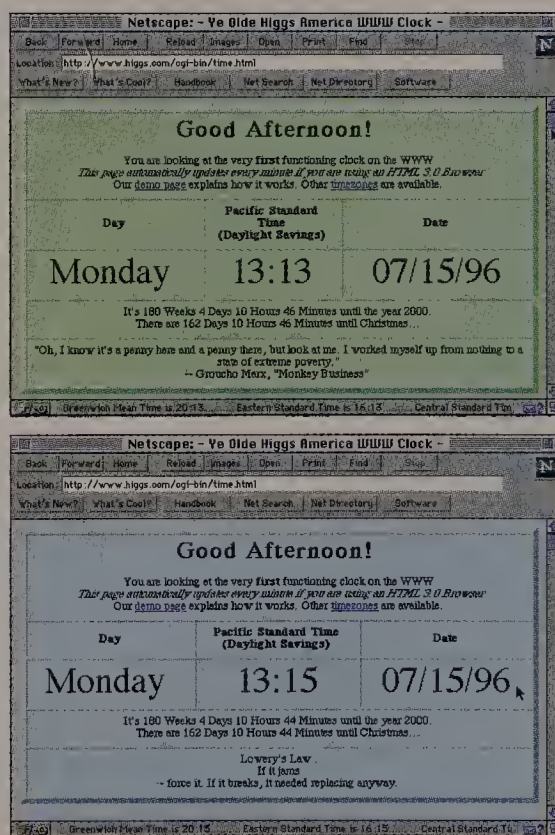
files, but they're far from complete forms-processing packages. For instance, they can't retrieve a form and redisplay it for update, and they can't organize the archived form contents in separate fields for subsequent processing and retrieval. For that you need a Web-enabled database CGI.

### The Plugged-in Database

Unlike Windows, whose Access database is bundled with the OS, the Macintosh has no built-in database facility. You can buy a third-party product, such as ACI US's 4th Dimension or Claris's FileMaker Pro, and use one of several shareware CGI tools for Web enablement, but none of the tools I tried were even close to usable for real-world applications. This stems partly from the dearth of industrial-strength structured query language (SQL) databases for the Mac. SQL is an industry-standard language for querying and manipulating relational databases. In the Macintosh realm, only one Web-enabled SQL database exists: EveryWare Development's Butler SQL 2.0.2 (\$695; <http://www.everyware.com>).

Butler SQL can serve a database over AppleTalk and TCP/IP networks, making it ideal for Internet use. It includes a database-builder tool that lets you construct the relational tables that make up your database, and can then process standard SQL queries from any Open Database Connectivity (ODBC)-capable client. This includes an interactive Macintosh client bundled with Butler, as well as Windows or Unix clients. None of this connectivity lets you query a database directly from a Web page, however. That's where EveryWare's companion product, Tango 1.5, comes in.

query requests and the displayed output. The query-definition editor stores these snippets in a single query-definition document rather than as separate HTML text files. The Tango CGI application retrieves the stored definitions when processing a Web browser's query request; it uses the stored definition to generate HTML for the query form on the fly, and then uses it again to format the results of the query in HTML.



**CUSTOM TIMEPIECE** The Higgs America WWW Clock (<http://www.higgs.com/cgi-bin/time.html>) uses Maxum's NetCloak to display the time and date, automatically updated every minute, customized for the capabilities of the viewing browser. For example, the page arranges output using HTML tables and presents a world time screen crawl in the bottom border if the browser supports those features. The background color and quote also change each time the page reloads.

### The Online Catalog

All the applications I've discussed so far help you add dynamic content to your Web site. Another approach is a stand-alone application that you tailor to meet your specific requirements. Perhaps the most common such Web application is the online product catalog; a close second is online order processing, which sells the products advertised in your online catalog. You get both of these applications in iCat's Electronic Commerce Suite 2.0 (\$4995 list, \$1495 introductory pricing; <http://www.icat.com>), which consists of the iCat Commerce Publisher for building and maintaining online catalogs, and the iCat Commerce Exchange for processing customer orders and collecting credit card payments. (Pacific Coast Software's WebCommerce Solution for Macintosh [\$1995; 619/675-1106, <http://www.pacific-coast.com>], which I did not test, also is designed to help you develop electronic-commerce Web sites.)

With iCat, a CGI program generates dynamic catalog pages and takes electronic orders, and a catalog editor creates your online catalog. You also get a slew of predefined catalog templates to which you only need to add your own product information and graphics. iCat stores product information in a Macintosh or Windows database; the CGI retrieves the information and constructs dynamic



HTML as remote users browse through your catalog. The CGI can run on Macintosh, Windows, and Unix (Sun and Silicon Graphics) Web servers, while the database must reside on a Mac or Windows machine.

If you stick to the predefined templates, creating a catalog is straightforward. You organize the catalog into sections or departments and then use the

catalog editor to create each department and database records for each item, detailing the item name, price, vendor, description, and background information. You can include digital photos or other graphics, and the database lets you add data fields. You can also associate support materials—movies, sounds, images, PDF files, or applications—with an item.

Next, you map items into depart-

ments—one item may appear in more than one department—and customize a few constant graphic elements with your company name and logo. Finally, you're ready for the publication step, which generates a series of HTML documents you can upload to your Internet server. Your catalog is online, ready to take orders.

Now visitors can browse the catalog and place orders, paying via credit card

## DUELING SCRIPTING OPTIONS: APPLESCRIPT VERSUS MACPERL

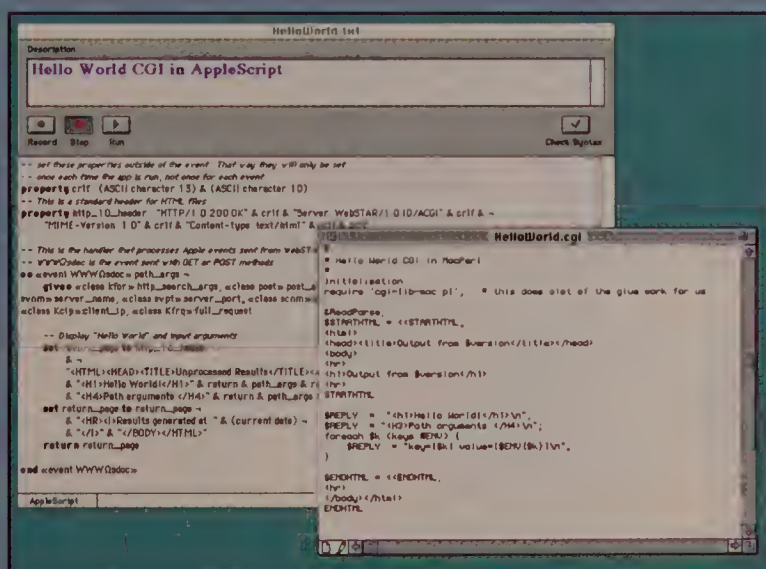
"THE KNIFE OR THE GUN" has never been an appealing set of alternatives; the choices for Mac CGI scripting languages pose a similar dilemma. On the one hand, AppleScript is easy to use, has a good development environment, and can take advantage of the features of Mac OS when necessary. On the other hand, MacPerl lets you tap into the vast library of existing CGI scripts on the Web and write portable scripts. Let's look at the pros and cons of these two widely used CGI scripting languages for the Mac.

### AppleScript Pros

- AppleScript comes bundled with the Mac OS. Apple designed it to have access to every nook and cranny of the Mac's operating system.
- Because you can manipulate the Finder and other Mac applications, you can interface virtually any Mac resource with a Web server.
- Developing CGI's is easier in AppleScript than in MacPerl. Popular Web servers, such as Quarterdeck/StarNine Technologies' WebStar, support AppleScript directly—you don't need anything else to begin writing scripts.
- AppleScript includes a language-sensitive editor that uses typeface changes and auto-indenting to make

scripts easier to understand and edit.

- A record mode lets you automatically generate scripts by recording and duplicating your actions, and you can buy more advanced script-development and debugging tools from third-party vendors.



**PROS AND CONS** AppleScript is easy to write and gives you intimate access to Mac OS functionality, but runs only on Mac servers. MacPerl is much less capable but is compatible with Perl, the most popular CGI scripting language.

### AppleScript Cons

- AppleScript is platform specific. It runs only on Macintosh servers.

### MacPerl Pros

- MacPerl is a Mac implementation of the wildly popular Perl (Practical Extraction and Report Language), the highly portable lingua franca of CGI scripting on Unix and Windows Web servers.

- MacPerl can run Perl CGI scripts written for Unix with little or no modification; and scripts that you produce in MacPerl can be ported to other platforms if you code them carefully.

### MacPerl Cons

- The current version is not a

complete implementation of Perl; it lacks system calls and the ability to pipe data between applications—features some complex CGI scripts use.

- MacPerl scripts must reckon with the Mac's file system, which uses colons instead of slashes for path separators.
- Applications that depend on Unix file-system security

won't work on the Macintosh, because MacPerl does not support AppleShare security attributes.

- With line endings in files, Mac files use the ASCII character code 13, where Unix uses ASCII 10. (When porting Unix scripts to the Mac, check for dependencies on the line-ending character.)
- To write CGI's, in addition to MacPerl you need to download a library of CGI utility routines, called `cgi-lib-mac.pl`, and the `MPCGI` utility for converting Perl scripts into Mac applications acceptable to Web servers. These requirements complicate Perl coding and put you through extra steps when writing and testing scripts.

- MacPerl supplies only a simple text editor and batch syntax checker; there are no third-party add-ons.

### Your Choice

Despite the multiple cons for MacPerl, there is no clear winner in this match. It depends on your situation. MacPerl wins hands-down if you're in a cross-platform environment. You also might use both languages—AppleScript for original development and MacPerl for porting CGI scripts from the Unix world. Weigh the pros and cons of each against your needs, and then add one or both to your Web arsenal.



## Tools for Invigorating Your Web Site

Company	Product	Star Rating <sup>A</sup>	List Price	Contact Information	Description	Comments
Apple Computer	AppleScript 1.1	★★★★/7.0	free	408/996-1010	CGI scripting language	Built into System 7.5; compatible only with Mac OS.
Tim Endres	MacHTPL 2.2.2	★★★★/6.2	free	time@ice.com	active-page preprocessor	Integral programming language.
EveryWare	Butler SQL 2.0.2	★★★★/6.5	\$695	905/819-1173	SQL database	Interoperates with any ODBC database client.
Development	Tango 1.5	★★★★/6.6	\$495	905/819-1173	database-enabling tool	Interoperates with any ODBC database.
iCAT	<b>Editors' Choice</b> Electronic Commerce Suite 2.0	★★★★/8.1	\$4995 <sup>B</sup>	206/623-0977	complete Web-site builder	Builds catalog Web sites; requires separate database server.
Maxum Development	NetForms 2.0	★★★★/6.5	\$195 <sup>C</sup>	708/830-1113	forms-processing aid	Includes discussion-group application.
	NetCloak 2.0.1	★★★★/5.6	\$195 <sup>C</sup>	708/830-1113	active-page preprocessor	Helps make HTML sensitive to browsers' capabilities; limited programmability.
Media Design inProgress	Interaction/IP 0.87 beta	not shipping	\$200 <sup>D</sup>	619/645-5250 <sup>E</sup>	forms-processing aid	Extendable with plug-ins and tool scripts; no field-level data manipulation.
Matthias Neeracher	MacPerl 5.0.6	★★★★/6.3	free	neeri@iis.ee.ethz.ch	CGI scripting language	Portable to other platforms; limited access to Mac OS functionality.

<sup>A</sup> Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) <sup>B</sup> Introductory price of \$1495 until September 30. <sup>C</sup> Volume discounts available. <sup>D</sup> Shareware, \$50 for noncommercial sites. <sup>E</sup> Telephone for license purchases; refer to URL in text for product information.

or COD. An optional CheckFree interface performs real-time credit card authorization. iCat uses the Secure Sockets Layer standard, in which critical financial information is encrypted as it's transmitted between the browser and server.

Because the iCat database is separate from the server, you can add catalog items, change prices, and do other catalog maintenance without re-creating the HTML documents. You only need to regenerate HTML if you change the structure of your catalog. As orders accumulate, iCat provides online reports summarizing orders and payments.

If you're brave, you can choose to develop your own catalog templates, which requires a consummate knowledge of HTML and learning the iCat command language. Fortunately, most users will find the stock catalog templates adequate. All in all, iCat is an impressive example of what you can do with a dynamic Web site.

### Write Your Own CGI

If you can't find an off-the-shelf tool to do what you want, you might consider writing your own CGI programs using a scripting language. Beware, however: scriptwriting is programming, and you need to understand the fundamentals of programs—variables, control structures, and input/output—to create successful CGI scripts.

Two products stand out as CGI scripting tools: Apple's AppleScript 1.1

(<http://www.info.apple.com>), which is built into System 7.5, and Matthias Neeracher's freeware MacPerl 5.0.6 (<http://www.iis.ee.ethz.ch/~neeri/macintosh/perl.html>). MacPerl is a version of the Practical Extraction and Report Language, originally developed by Larry Wall for Unix but now a popular cross-platform CGI scripting language. AppleScript has the advantage of providing powerful access to every aspect of a Macintosh; the disadvantage is that AppleScript requires the Mac OS. MacPerl, while less capable than AppleScript, is portable to both Unix and Windows Web servers. Which language you choose depends on whether you need this portability (see the sidebar, "Dueling Scripting Options: AppleScript versus MacPerl," for additional language-selection information). A good source of AppleScript CGI programming tutorials is ComVista's Macintosh Web Resources site (<http://www.comvista.com/net/www/cgilesson.html>); for MacPerl programming secrets, visit Sandra Silcot's MacPerl Primer (<http://www.unimelb.edu.au/~ssilcot/macperl-primer/>).

Even if you never write your own CGI scripts, you might want to incorporate useful scripts written by others. You can find a vast library of AppleScript CGIs at <http://www.comvista.com/net/www/cgi.html>; the MacPerl Home Page lists publicly available MacPerl scripts. You'll discover scripts that track user statistics, manage guest books and discussion lists, retrieve information from Macin-

tosh applications and documents, and perform sophisticated searches on text-file collections.

### The Last Word

As the Internet becomes more crowded and Web sites jostle for attention, making your presence unique and valuable to users becomes more important than ever. Gone are the days when a pretty picture and a sound bite or two could secure user loyalty. Now you must give visitors both value and variety to get repeat traffic. Getting your feet wet with dynamic content development will put you ahead of the pack when the next technology wave comes rolling in. **m**

Contributing editor MEL BECKMAN ([mel@becknet.com](mailto:mel@becknet.com)), a consulting network engineer, helps companies develop their Internet connection strategies.

### SOFTWARE FOR BUILDING DYNAMIC WEB SITES



Stability, ease of use, and cross-platform support are key when evaluating software that helps make the content on your Web site interact with visitors.

**★★★★/8.1 Electronic Commerce Suite 2.0**  
It builds complex yet robust Web sites quickly and easily. **Company:** iCat (206/623-0977, <http://www.icat.com>). **List price:** \$4995.



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# WEB AUTHORIZING'S





# NEW TOOLS

Choose the right  
software for build-  
ing a better site **by**  
**Mel Beckman**

IF YOU'VE SPENT any time developing Web pages, you know that HyperText Markup Language (HTML) seems amazingly easy to write for simple projects, but becomes devilishly difficult once you advance to nested HTML or advanced features such as tables. Simply remembering all the options for various HTML elements taxes your long-term memory, and the mental gymnastics required for tags within tags can affect your sanity.

Fortunately, a number of HTML authoring aids can ease your pain. Even simple text-editor add-ons that do nothing more than provide templates for HTML tags are a big help. Better still are HTML-specific editors that show tags in distinctive colors and fonts. Other authoring tools let you leverage existing content by converting foreign document formats, such as Microsoft Word or QuarkXPress, into HTML.

The holy grail of HTML editing, the WYSIWYG HTML editor, isn't quite here yet, but a couple of authoring tools come close by integrating an editor and a Web browser in one package. Finally, some tools manage all the components—links, graphics, documents, and directories—as a whole.

I tested software in all these categories. Which tools work for you depends on the kind of Web site you're producing. For simple sites consisting of just text, graphics, and hot links, an HTML WYSIWYG editor might be fine. For complex HTML development requiring fine control of HTML tags, you need a good HTML-specific editor. You might need to combine tools: a WYSIWYG editor to build basic pages, an HTML editor to fine-tune, and a site-management program to organize everything.

## Out of Sight, Out of Mind

If you don't want to mess with actual HTML code or you're willing to live with the limitations of tools that hide HTML, consider a WYSIWYG page-layout editor. None of the tools I tested—Adobe Systems' PageMill 1.02, PrimeHost's GNNPress 1.1, Netscape





Communications' Navigator Gold 3.0 (I tested the beta 4 version), and the University of Iowa's Arachnid 1.6—are truly WYSIWYG in the sense that, for example, Adobe PageMaker is. But all are useful starting points for Web-page development. (See *News*, September 1996, for a look at a beta version of Claris Home Page personal Web authoring software [408/727-8227, <http://www.claris.com>].)

PageMill (\$99; <http://www.adobe.com>) is easy to use, letting you type text and drag and drop graphics to construct a page, and displaying what you'd see in a Web browser. PageMill doesn't support tables—an inconvenience if you use tables to align HTML form elements—and won't let you type in your own HTML. GNNPress (free; <http://www.primehost.com>) does tables, lets you add and edit underlying HTML, and has a search-and-replace function. Navigator Gold (price was not set at press time; 415/937-2555, <http://home.netscape.com>) lets you edit most objects, including tables and forms, right on the page. Arachnid (free; <http://www.uiowa.edu/~sec-look/sec-look.html>) doesn't create HTML documents directly. Instead, you construct pages and store them in a single project file.

With all these products, you create hot links by selecting text to link and then typing the associated URL. Built-in transparency and image-map tools sim-

plify image manipulation. Each product has its own pluses. The GNNPress software is free; you pay for the Web-site hosting service (\$199 per month, plus \$349 in start-up costs, for a commercial site). Netscape's forms editor makes form building a snap, and a publish feature promises automatic uploading of HTML documents to your Web site (although the feature did not work in the beta version I tested). GNNPress and Netscape both function as bona fide Web browsers: you can browse and edit from the same application. Arachnid can treat your site as a whole, letting you reorganize pages without breaking interpage links.

All four products could stand improvement, however. In addition to missing table and HTML-editing features, PageMill lacks search-and-replace and spelling-check functions. GNNPress is as slow as molasses in Tierra del Fuego (and it's not PowerPC native). Navigator, although a reasonably fast browser, is a slow editor, even on a Power Mac. Arachnid lacks any publishing capability at all. Assuming Netscape fixes its glitches, Navigator 3.0 has the potential to be a true WYSIWYG editor.

#### Hands-on Editing

Eventually you'll need to dig down into HTML and fix something. That's where HTML text editors are useful.

Bare Bones Software's BBEdit 4.0 (\$119; <http://www.barebones.com>) has a slew of built-in HTML coding aids, all collected on a convenient floating palette. This editor lives up to its name in minimalist capability: it will insert HTML tags into a document but does no formatting. Showing tags in another color or font would enhance readability. To its credit, BBEdit's spelling-check and search tools are HTML savvy, and its search capabilities—regular expressions and multiple-file processing—work with HTML documents. The tool palette includes functions for link validation, tag balancing, checking syntax, and addition of repeating elements, all of which make this a useful tool for any active Webmaster.

Rick Giles's HTML Editor 1.1.4 (\$25 shareware; [http://dragon.acadiau.ca/~giles/HTML\\_Editor/Documentation.html](http://dragon.acadiau.ca/~giles/HTML_Editor/Documentation.html)) has virtually all of the HTML-editing functionality of BBEdit (except a spelling checker), with the added advantages of semi-WYSIWYG formatting and distinctive, easy-to-read rendering of HTML tags. Text displays in appropriate sizes, hot links show as blue underlined text, image tags appear in red, and HTML tags shrink to tiny gray type fading into the background. Features include built-in conversion for Unix and DOS files, wizards for complex HTML ensembles such as forms and tables, and dynamic links to

## WEB AUTHORING TOOLBOX

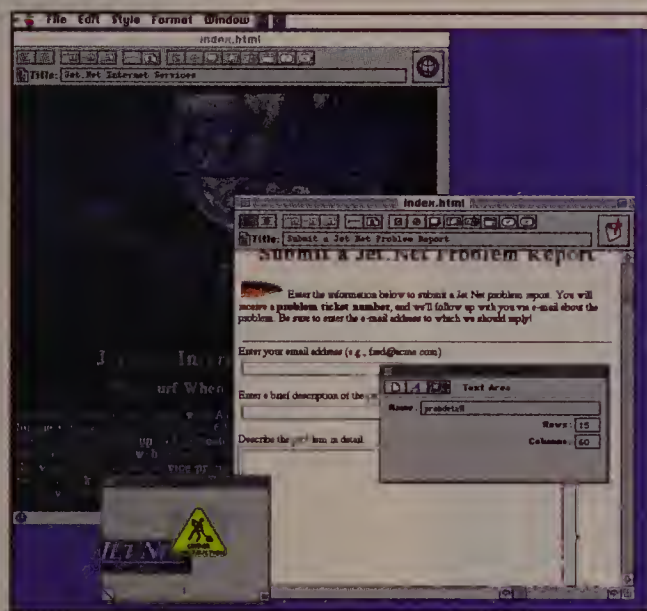
Company	Product	Star Rating <sup>A</sup>	List Price	Contact Information	HTML Function
Adobe Systems	HTML Author	★★/3.8	Included with PageMaker 6.0	415/961-4400	conversion plug-in for Adobe PageMaker
	PageMill 1.02	★★★★/6.7	\$99	415/961-4400	WYSIWYG editor
	SiteMill 1.0.3	★★★★/6.3	\$595	415/961-4400	WYSIWYG editor plus Web-site-management tool
Astrobyte	BeyondPress 2.0	★★★★/7.0	\$595	303/534-6344	conversion plug-in for QuarkXPress
Bare Bones Software	BBEdit 4.0	★★★★/5.4	\$119	508/651-3561	text editor
Rick Giles	<b>Editors' Choice</b>				
	HTML Editor 1.1.4	★★★★/7.9	\$25	<a href="mailto:rick.giles@acadiau.ca">rick.giles@acadiau.ca</a>	text editor
Harlequin	<b>Editors' Choice</b>				
	WebMaker 2.2	★★★★/7.9	\$99	617/374-2400	conversion plug-in for FrameMaker
HexMac	HexWeb XT 2.0	★★★★/5.6	\$349	415/864-7592	conversion plug-in for QuarkXPress
Microsoft	Excel Internet Assistant	★★★★/7.8	free	206/882-8080	conversion plug-in for Excel
	Word Internet Assistant	★★★★/7.8	free	206/882-8080	conversion plug-in for Word
Open Door Networks	WebDoor 1.2	★/1.0	\$20 to \$60 a month	541/488-4127	WYSIWYG editor
PrimeHost	GNNPress 1.1	★★★★/6.1	\$199 a month, commercial site <sup>B</sup>	800/879-6882	WYSIWYG editor plus Web-site-management tool (also site hosting service)
SoftQuad	HoTMetaL Pro 2.0	★/2.9	\$159	416/239-4801	text editor
University of Iowa	Arachnid 1.6	★★/4.6	free	<a href="mailto:robert-mcburney@uiowa.edu">robert-mcburney@uiowa.edu</a>	WYSIWYG editor

<sup>A</sup> Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for explanation.) <sup>B</sup> \$349 start-up costs.



online validation services that run your Web documents through numerous filters and compatibility tests.

One Web editor that just doesn't cut the mustard is SoftQuad's HoTMetaL Pro 2.0 (\$159; <http://www.softquad.com>). Rather than letting you edit HTML directly, HoTMetaL Pro replaces cryptic HTML tags with equally cryptic tablike symbols that hide the actual HTML code.



To edit a tag, you double-click on the symbol and make changes to the tag in a dialog box. This lets HoTMetaL perform rule checking that makes it practically impossible to enter bad HTML code. Unfortunately, the tab-symbol facade makes Web-page construction tedious. As with HTML Editor, text appears in a size and style approximating its final look. Nice touches include a spelling checker, an outliner, and a thesaurus, although these last two have dubious value in Web-page construction.

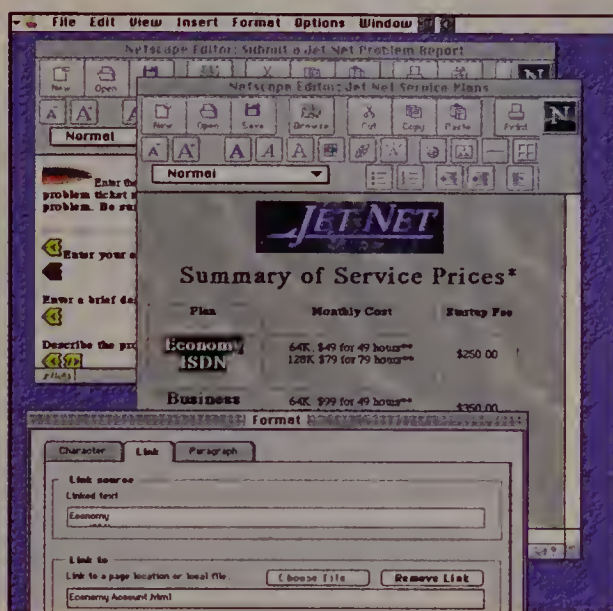
When you must incorporate content from Microsoft Word documents and Excel spreadsheets, you can download Microsoft's Internet Assistant plug-ins from Microsoft's Web site (<http://www.microsoft.com>). These convert existing Word or Excel files to HTML, translating the original's formatting to the nearest Web equivalent. For quick-and-dirty conversions they work well, but you may want to fine-tune the resulting HTML with an HTML editor.

#### Convert What You've Got

For large-scale Web production projects, such as putting a print publication online, you need tools that work with desktop publishing programs. You can convert document formats from Adobe Frame-

Maker, Adobe PageMaker, and QuarkXPress to HTML using add-on tools.

Harlequin's WebMaker 2.2 (\$99; <http://www.harlequin.com>), a stand-alone postprocessor, turns FrameMaker documents saved in MIF format into HTML by applying predefined conversion rules. WebMaker can also generate a table of contents with hot links to each chapter and section, as well as an index with each



entry providing a hot link to its originating reference. WebMaker converts cross-references embedded in the FrameMaker document to internal hot links; for external links you must manually code hidden commands. Rules written in WebMaker Language (WML) control the conversion process. You don't have to learn WML—a RapidRules command creates a sensible WML set for you—but to fine-tune the resulting HTML, you need to get acquainted with WML.

WebMaker does a good job just converting ordinary FrameMaker documents, although such documents usually don't take advantage of Web features such as embedded graphics and hypertext links. It's possible, however, to modify existing FrameMaker templates to accommodate HTML production and then add internal and external links during editing.

If you need to convert QuarkXPress documents to HTML, your options include Astrobyte's BeyondPress 2.0 (\$595; <http://www.astrobyte.com>) and Hex-Mac's HexWeb (\$349; <http://www.hexmac.de>). See *Reviews* in this issue for a comparison of these Quark XTensions. In addition, Extensis (503/274-2020, <http://www.extensis.com>) has announced that it will bundle its XPress-to-HTML plug-in CyberPress 1.0 with Adobe PageMill 2.0

(\$149.95, company's estimated price; scheduled to ship in September).

For converting PageMaker documents to HTML, Adobe includes its HTML Author plug-in with PageMaker 6.01. HTML Author lets you add hypertext links, set the background color and image, and set up style sheets for mapping PageMaker text styles to HTML styles. Missing is any support for HTML tables,

**WYSIWYG ATTEMPTS** Adobe Page-Mill's easy WYSIWYG editing makes Web page layout nearly as simple as desktop publishing (left). A built-in forms editor makes form creation quick and painless.

Netscape's Navigator Gold 3.0 will include both page-editing and publishing functions. Beta version 3 (right) shows how you can edit tables directly, and even embed other HTML, such as hot links, within a table entry.

image maps, or repeating links. Nor does this plug-in let you convert text to an embedded graphic.

#### All-in-One Option

If you want hand-holding from site conception through online publication, consider an all-in-one Web publishing solution that combines a Web host service and an HTML editor with Internet access. You usually pay for the hosting service by the megabyte stored for your site and the number of hits or megabytes of online activity per month. The cost may not be competitive with your Internet service provider's—you're buying convenience, after all—but for getting a Web page up fast, this approach has appeal.

GNNPress 1.1 comes closest to realizing this ideal. Its Web editor, described earlier, is powerful (albeit not fast). You won't have any trouble composing sophisticated multipage sites, and with GNNPress's integrated database tools, you can even add such advanced features as online order processing. Even more compelling is PrimeHost's hosting service, which has an attractive interface and a community feeling, a large library of Web-site templates and drop-dead killer bandwidth—a full 45-Mbps T3 Internet connection.



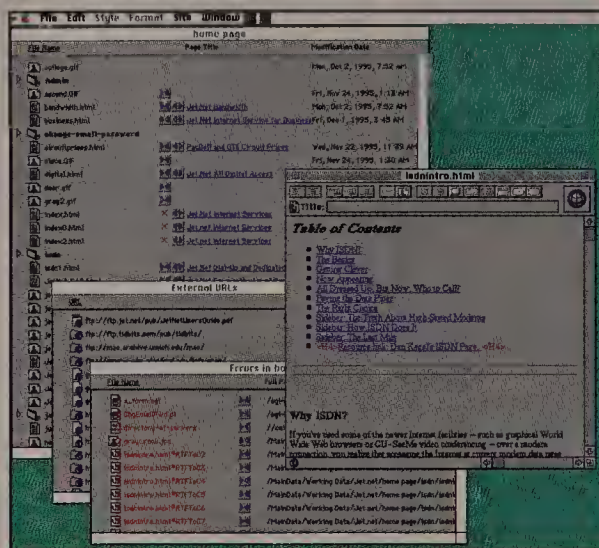
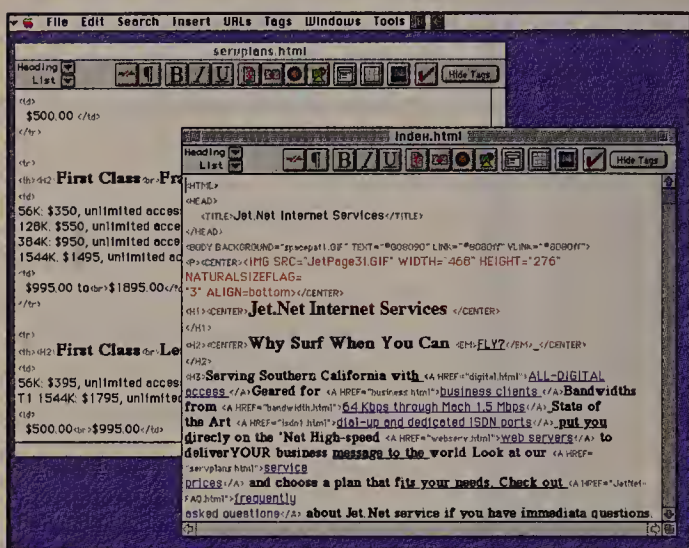
Open Door Networks' WebDoor 1.2 (\$20 to \$60 per month; <http://www.opendoor.com>) Web publishing service is less expensive but not nearly as usable as PrimeHost's. WebDoor's hosts run on a much slower Internet connection than PrimeHost's, and performance suffers visibly. You connect to WebDoor's server via Apple Remote Access—a Macintosh-centric and easy-to-use process—or via TCP/IP.

the tags in a moved document so that moving the graphics isn't necessary. An external URL viewer shows you all the URLs from every page at once, letting you make global changes easily. However, SiteMill won't help you with URL verification—you must do that in a browser. Aside from the one-object-at-a-time limitation, SiteMill is a powerful tool for keeping your Web site intact.

GNNPress 1.1 has a built-in site-

built-in Web authoring, you'll find Adobe SiteMill hard to beat. At press time, both SiteMill and PageMill were about to enter beta testing of version 2.0; the new versions will support tables and address Adobe's other authoring shortcomings.

Is this the last word in Web authoring tools? Hardly. New products are flooding the market, driven by the Mac's preeminent position as a Web authoring and serving platform (see "It's Raining



**BEHIND THE SCENES** HTML text comes alive in Rick Giles' HTML Editor (left). Browser-viewable text approximates its final appearance, while HTML code subtly fades to the background in a small gray font.

Adobe SiteMill (right) shows you a whole Web site at a glance, automatically locates and flags erroneous HTML, and lets you review and edit URLs in a unified list.

Unfortunately, WebDoor's authoring software is abysmal. It consists of an obtuse, cheesy HyperCard stack that behaves unpredictably and generates Web pages in only one inflexible layout format. You're much better off using practically any other Web authoring tool.

### The Big Picture

Most Web sites contain multiple Web pages, connected by hypertext links. For convenience, you'll want to organize a complex Web site in a series of nested folders. But problems arise when you try to move HTML documents between folders: hot links break and graphics get lost. As your Web site grows, other management issues crop up: updating common text across multiple pages, validating and repairing out-of-date external links, and renaming files for compatibility with various Web servers.

To the rescue come site-management tools. Adobe's SiteMill 1.0.3 (\$595) combines PageMill with a tool for manipulating all the files in your site in a single window. SiteMill gives you an indented list view of your HTML documents and other objects, and lets you freely move objects—one at a time—between folders, automatically updating all links.

SiteMill won't automatically move graphics files for you, but it will update

management tool: a Web-like map of your site's files and links. You can rename or move files, and GNNPress maintains link integrity. A Check Links command checks the syntax of links (but does not validate them) and prompts you to fix broken ones. The slow speed of GNNPress makes its site-management functions tedious to use; for large sites you're better off using SiteMill and GNNPress.

### The Last Word

Of the four WYSIWYG contenders I tested, I tip my hat to Adobe's PageMill for its reliability and flair. With HTML text editors, clarity goes hand in hand with functionality, and Rick Giles's HTML Editor gets my recommendation as the best all-around HTML coding aid.

When putting existing publications on the Web, the conversion tool you pick depends on the desktop publishing application. However, in this category, the WebMaker HTML converter for FrameMaker is the easiest to use and to integrate into the print-media publication process.

For top-to-bottom Web authoring and publishing, GNNPress wins hands down. Although it's slow, it does its job well and fully; there is hope for improved performance if PrimeHost ships a PowerPC-native version.

Finally, for site management with

Web Editors" in *News*, this issue). Look for at least two major new products: Microsoft's Front Page (already out for Windows) and Akimbo Systems' Globetrotter, both of which promise to set new standards for Web authoring versatility. **m**

Contributing editor MEL BECKMAN ([mel@becknet.com](mailto:mel@becknet.com)) is a Web author and network manager who spends too much time on the Internet.

### WEB AUTHORING TOOLS



Functionality, reliability, and flexibility are key when picking Web authoring tools. Here are two that accomplish their stated tasks with aplomb.

★★★★/7.9 **HTML Editor 1.1.4.** This HTML editor's thoughtful and comprehensive editing features make it an essential Web authoring tool.  
**Company:** Rick Giles ([http://dragon.acadiau.ca/~giles/HTML\\_Editor/Documentation.html](http://dragon.acadiau.ca/~giles/HTML_Editor/Documentation.html)).  
**List price:** \$25 shareware.

★★★★/7.9 **WebMaker 2.2.** For converting FrameMaker documents to the Web, WebMaker has no equal. Its flexible design makes it a model of how to implement Web converters.  
**Company:** Harlequin (617/374-2595, <http://www.harlequin.com>). **List price:** \$99.



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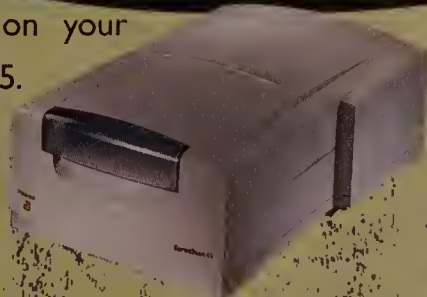
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Using Battery

Electrical Wiring

1

5

2

6



"Back-UPS Office is a shooin for the small-office/home-office computing market and for general desktop workstations."  
— Computer Reseller News

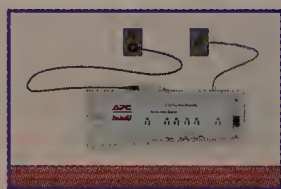
APC products have won more awards for reliability than all other UPS vendors combined.



1

## User-replaceable Batteries

Cells can be easily swapped out, saving time and expense; no need to return to the factory for service. Batteries last 3-6 years under normal usage.



Back-UPS Office's compact design installs easily on desktop, floor, or mounts to wall. Its ninety-degree plug fits flush against the wall.

2

## Battery Replacement Warning Prevents Downtime

An LED signals when the Back-UPS Office's internal self-test finds the battery near the end of its life. Users have 6-8 weeks warning.

3

## Convenient BlockSafe™ Outlet Spacing

Back-UPS Office's outlets are spaced to accommodate all size plugs, including large transformer blocks. No need to sacrifice the use of any outlets to accommodate large block plugs.

5

## Integrates the Security of a Surge Suppressor with the Power of a UPS

Back-UPS Office provides enough outlets to protect your customers' entire system. Six outlets guard your hardware with full time surge protection. Three of the six provide instantaneous battery backup to keep your system from crashing in the event of a brownout or blackout.

6

## Site-Wiring Fault Indicator

Without a proper ground, most surge protection is useless. Back-UPS Office alerts you to wiring problems such as missing ground and reversed polarity, two common wiring mistakes which otherwise would require an electrician's visit to diagnose.



# Multipath™ Back-UPS® Office™ - then the lights went out."



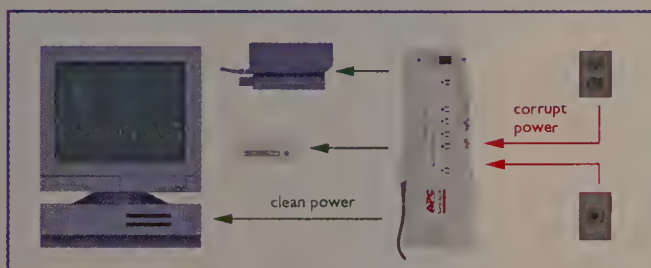
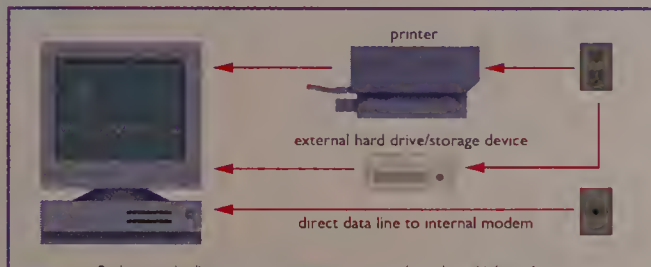
Facing the issue is hard, but inevitable: You have a better chance of winning the lottery than of escaping power problems: They're the single largest cause of computer data loss and hardware damage.

Back-UPS Office provides reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your Mac, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true Multipath™ safety net under any remaining integrated peripherals, like modems, printers, faxes and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large block transformers.

## Unique Multipath protection keeps your Mac safe

Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive Mac.

### MULTIPATH™ MEANS TOTAL POWER PROTECTION



**4 Recessed Master On/Off Switch**  
Prevents accidental shut-offs and conveniently controls power to the entire connected system.

**7 Circuit breaker**  
Provides protection in the event of an overload or short circuit; no fuse, no hassle.

**Internet Ready Fax/Modem Protection**  
Back-UPS Office's built-in phone line/10 Base-T network cable surge protection prevents data line surges from damaging internal and external modems, motherboards, input/output cords, and other system components.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, if a power sag makes your modem drop the line while you're downloading from the Internet, or locks your keyboard before you've saved work, you lose time, money and spend another late night at the office to meet your deadline.

## Back-UPS Office: a safe place to plug everything

Until now, protection for your entire system required several devices. But multi-device protec-

**Only Back-UPS Office provides single device Multipath™ protection for all your equipment**

THE MULTIPATH™ POWER PROTECTION ADVANTAGE	TRADITIONAL SURGE PROTECTOR	TRADITIONAL UPS	BACK-UPS OFFICE
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Data			•
Phone			•
Total Outlets	7	2	6
Number of Block Outlets			2
Protection from:			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Overvoltages		•	•
Typical Runtime in Minutes with Pentium 100 w/15" monitor:		10	10
Battery backup for:			
PC		•	•
Monitor		•	•
Storage Devices/Zip Drives			•
Full-time surge protection for:			
Fax/Modem	•		•
Laser Printer	•		•
Scanners	•		•
Dataline protection for:			
Internet or Network			•

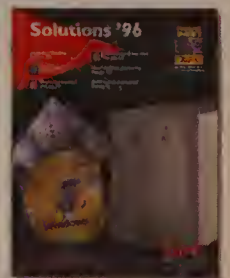
Traditionally, protecting all your peripherals meant having to buy a surge suppressor and a UPS. Even then, only the AC line was protected. Back-UPS Office protects all paths: Bulletproof Multipath protection.

tion can leave you vulnerable to line noise and unwanted data glitches created by the voltage differential between outlets. Those glitches are prevented with the Back-UPS Office common voltage reference.

Back-UPS Office means true Multipath™ protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, with protection guaranteed up to \$25,000.

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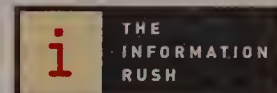




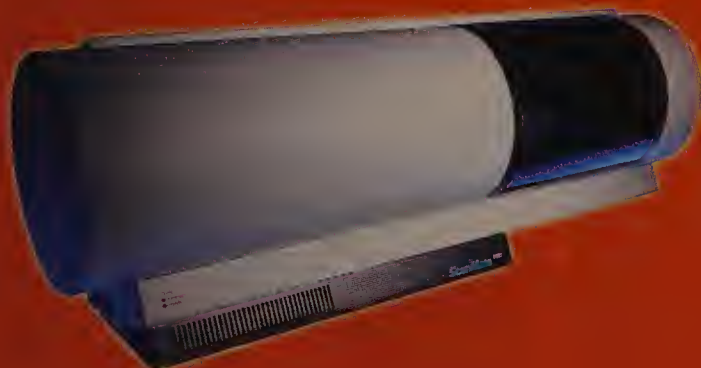
ImageSetter on a Tabletop:  
ECRAM ScriptSetter 4920

IT SEEMS UNBELIEVABLE NOW, but a mere eight years ago this month, the cover of Macworld seriously posed the question: "Desktop Publishing—Is It Worth It?" Today, we take desktop publishing for granted, but only up to the point where we send our files and photos off to the service bureau for high-resolution scanning, color proofing, process separation, and imagesetting—those things too difficult or costly to do yourself.

Or are they? Prepress vendors are scaling down their products to tabletop size and substratospheric prices, while making them easier to use. This is partly to compete in the established prepress market. To those who know history, though, it's a cue to ask the same sorts of questions we were asking eight years ago: Can you bring a service bureau in-house? How much should you take on? What's involved? What will



Get It on Film:  
ScanView DotMate 4000

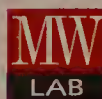


Drum Roll, Please:  
ScanView ScanMate 3000

it cost? And the big question: Is it worth it?

We asked these questions of vendors, service bureaus, and customers who've brought part or all of their prepress operations in-house, to get the lowdown on the costs and returns of internalizing prepress. Next, we converted a portion of Macworld Lab into a hands-on, in-house service bureau. We brought in scanners, imagesetters, and color proofers, all at entry-level to midrange prices for prepress gear. Due to issues of waste management—discussed below—we had our film developed by our service bureau, Digital Prepress International, which also prepared our analog proofs because the necessary equipment was too large to bring into our lab.

Three users, from a Mac-savvy prepress novice, to a lab analyst with extensive product experience, and a service-bureau veteran, tried their hands at operating the equipment. Finally, a panel of *Macworld's* designers, editors, and art directors rated the results.



PHOTOGRAPHS BY PAUL FRANZ-MOORE



The upshot: Service bureaus are not yet going the way of typesetting houses, if only because low-volume customers will need them for years to come. However, the control, efficiency, and cost advantages of an internal service bureau are already compelling for businesses or corporate departments; for example, those creating advertising and marketing collateral; high-quality, short-run print jobs; and catalogs—in short, any type of print publishing as long as your volume can support it. You will need to know how much you are currently spending and compare it with the costs of equipment, consumables, labor, training, reconfiguring workspace, software, and upgrades.

Within the next few years, service bureaus will need to adjust as their largest clients shift prepress production in-house. Meanwhile, if you're one of those clients and you're planning to stay competitive, you should start looking at internalizing your prepress operations today.

#### Full Service versus Self-Service

The array of hardware in a professional service bureau is staggering in its variety, bulk, and cost. Consider, however, that a service bureau's needs are the sum of all its clients'—and potential clients'—needs. To stay in business, it must provide a wide range of functions and compatibility.

By contrast, an in-house service bureau has only one client: you. You can standardize your hardware and software, and limit the components of your system to only those you need. If the odd job requires something you don't own, you can send that part of the job to an external service bureau. As your needs change, you can add to your system.

The basic components of a typical prepress system include RAM- and storage-stocked Mac workstations (we recommend at least 64MB of RAM and 4GB of fixed storage to start) for scanning, image editing, and document creation (including software such as Adobe Photoshop and PageMaker [415/961-4400, <http://www.adobe.com>], Macromedia FreeHand [415/252-2000, <http://www.macromedia.com>], QuarkXPress [303/894-8888, <http://www.quark.com>]); high-end flatbed or drum scanners; digital proof printers; imagesetters, including computer controllers with software raster image processors (RIPs); film processors; and equipment for processing analog proofs.

Before you dig into the details of pre-

press components, though, you'll need to weigh the advantages and disadvantages of bringing them in-house.

#### Why You Should Just Do It

There are three reasons you'll want to bring your service bureau in-house: money, time, and control. Can you really save money over simply sending your work out to a service bureau? You can. Service bureaus have the same costs you do—equipment, labor, training, maintenance, consumables—mitigated only by volume. If you produce enough to make your costs lower than what they charge

An  
in-house  
service  
bureau has  
[ ONE CLIENT ]  
—you

for their value-added service, you come out ahead. (Remember that we're talking about the volume of prepress work, not the length of the print run. Even though *Macworld* has a large print run, we use a service bureau because we only run about 200 pages of film per issue.)

How much volume does it take? We looked at the 1995–1996 Production Employees Industry Wage and Compensation Survey, conducted by the Human Incentive and Resource Education Institute (HIRE), of Falls Church, Virginia, and the 1995 Wage and Benefit Survey from the Printing Industries of Northern California, of San Francisco, to see what

electronic prepress workers earn. Then we sampled rate cards from service bureaus in various parts of the United States for the typical cost of using an outside prepress operation.

According to HIRE, the national average hourly rate for electronic prepress workers is \$12 to \$18, with the top earners pulling in \$25 to \$30. Compare the average scanner operator's \$15 to \$18 per hour with the typical service-bureau charge of \$35 to \$45 for a 150-lpi 4-by-5-inch transparency scan at 100 percent (with a 24-hour turnaround). Even at one \$45 scan per hour, eight hours a day, five days a week, that's \$93,600 in a 260-workday year. At \$18 per hour, your scanner operator makes \$37,440. Even adding 50 percent for benefits, you've just paid for the average \$40,000 scanner without breaking a sweat; with a heavier workload involving image editing (\$100+ per hour at a service bureau), you'd be in the black much sooner.

Digital proofing and imagesetting are little more than print jobs as far as labor is concerned; because output is not as labor-intensive as input, savings come quickly. A dye-sub tabloid proof runs about \$45 with a three-hour turnaround. Two a day would cost you \$23,400 a year. With your own proofer, proofs cost about \$7 per page—\$3640 at two per day for a year. That buys your proofer. Imagesetting to film at 2540 dpi typically costs \$24 per color per tabloid page, so every four-color page of your document costs \$96 to "RIP." Four pages a day would cost just under \$100,000 in a year; subtract the cost of consumables, and you've handily paid for a good imagesetter.

For a real-world example, take Macy's West, the West Coast operation of the venerable chain of department stores, and a division of Federated Department Stores. In the early nineties, its art department looked upon computers with disdain and distrust. Production and prepress were handled outside, to the tune of \$6 million annually. Then, in late 1993, Macy's took the digital plunge. Advertising director Jaake Jacobsen brought a detailed cost analysis of his division to meetings with several prepress vendors before settling primarily on equipment from Linotype-Hell (<http://www.linotype-hell.com>). One year and \$4 million later, Macy's West had internalized all production and prepress functions. The result? The machinery paid for itself within 12 months.



# Expert versus Novice: Who's Scanning Who ?

**WILL THE EXPERT** scanner please stand up? Here are four input samples from the prepress scanners we tested, plus one (at left) done on a Crosfield scanner at our own outside service bureau. They're split diagonally to show how our novice operator did and how our experienced operator did. Can you tell which is which? Notice the difference in the shadow cast by the pear onto the photograph's matte. Despite a few differences in gray balance, our expert (who did the scans in the upper triangles) and our novice (who did the scans in the lower triangles) attained almost identical results. Perhaps not surprisingly, *Macworld's* art and design director preferred the expert's scans; all the other judges preferred the novice's. The simple conclusion: in-house, you only need to please yourself.





Cash flow isn't the only benefit. Macy's West cut its production cycle for newspaper ads from eight weeks to four, and simple last-minute changes to catalogs or ad copy that once took days now take hours. Such nimbleness gives a retailer an edge in maintaining competitive pricing and clearing inventory.

Control over quality is the third major reason to bring prepress in-house. As long as you have the requisite skills, it's easier to get what you want yourself than it is to communicate what you want to a service bureau. Time is also a vital part of control. Because you can check and fix your work much more quickly, you can afford to experiment or simply to tweak for that extra level of quality where you previously would have settled for less.

### Why You Should Think Twice

Cheaper, faster, better—convincing reasons to bring your service bureau in-house. If it's such a brilliant idea, though, why haven't more companies done it? The reasons again are time, control, and—above all—money.

The initial expenditure for equipment is higher than it seems at a glance. You can

assemble a spartan prepress setup for under \$200,000, but a system based on one machine for each function assumes a very limited workload. Every minute you have a job waiting for the gear, you're wasting money. Every minute a machine sits idle is also wasted. Finding the perfect balance requires careful analysis of your current and projected productivity.

Next, figure out your minimal setup . . . and add a spare everything. Equipment breaks, and repairs can take days. Unfortunately, work can't wait. It's risky to use an external service bureau as a backup system because it will take even longer than repairs would and cost more. Meanwhile, you've reserved your printer's services in advance, and you'll pay for them whether your job is ready or not. Seriously consider installing redundant systems because otherwise, even a minor failure can bring a business to its knees.

If your staff lacks the skills to run your new equipment, you'll have to train it, hire new people, or both. Either way, you won't be operating at full efficiency overnight. Still, there are benefits in labor costs. Macy's West, for instance, went from 65 staff members to 35 by eliminat-

ing typesetting, paste-up, and ad-traffic personnel. Only a few design staffers who couldn't make the transition were replaced; the rest were brought along into the digital age.

Also, while training is critical, the difficulty may be overrated. When our panel compared the work of our novice, intermediate, and expert users, we got a surprise: the novice's scans got the highest overall marks. No ratings were less than satisfactory, and most were good to excellent. Clearly, solid Mac skills and color sense can take you a long way in a short time. If your staff is already proficient in desktop publishing, developing prepress skills shouldn't be a major hurdle.

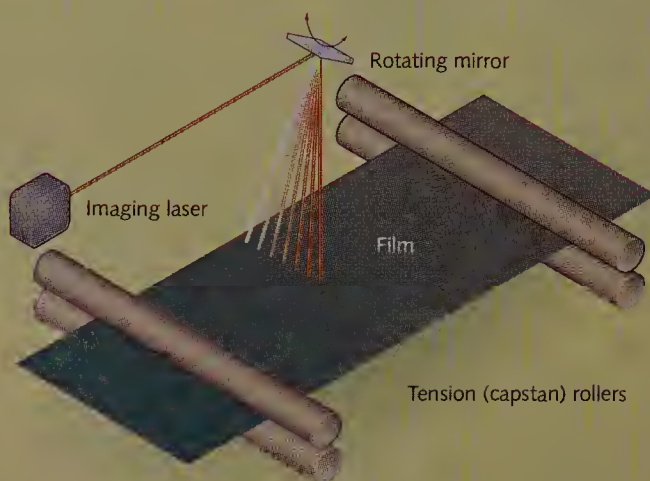
Once you have your hardware and staff, where will you put them? Square footage is less a problem than you might think, because people take up more space than machines. However, you'll need to redesign space based on the workflow.

Whether stand-alone or in-line, film processors need a room with adequate ventilation. In addition, waste handling remains critical. The developing chemicals are toxic, as is the silver that washes off the film, so you'll need expensive cus-

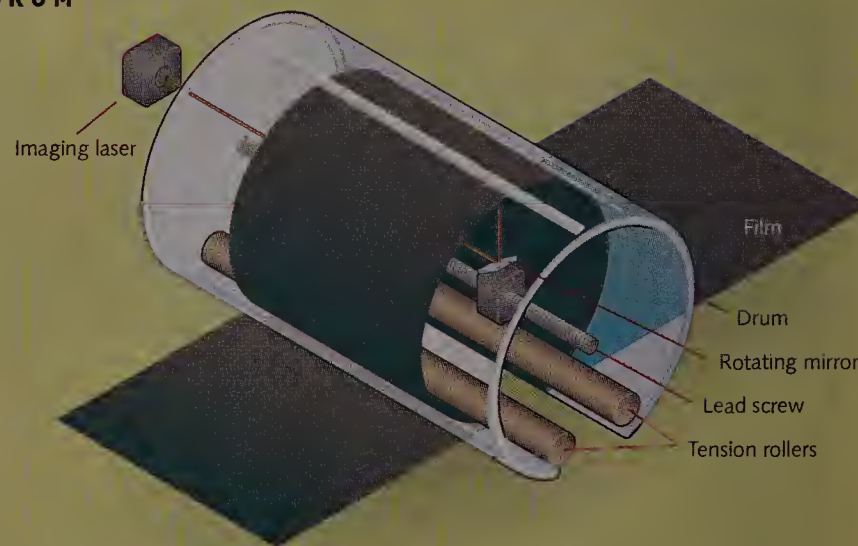
## TWO DIFFERENT WAYS TO IMAGE FILM

There are two main types of imagesetters—capstan and drum. Each takes a different approach to imaging film, but both produce excellent results.

### CAPSTAN



### DRUM



**Film Handling** In an internal drum imagesetter, film enters and exits a large drum through a gap at the base of a stationary drum. Tension rollers on either side of the gap hold the film flush against the inside of the drum. In a capstan imagesetter, film enters and exits the imagesetter between tension rollers, which hold the film taut and flat.

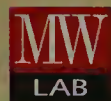
**Film Imaging** Internal drum imagesetters have an imaging laser that is attached to a lead screw that runs down the middle of the drum. As the laser spins, it slowly moves across the drum, writing the image line by line. The film is always at the same distance from the laser. Capstan imagesetters have a sta-

tionary laser that reflects off a spinning mirror located directly above the film. As the mirror spins, it moves the writing laser side to side across the film.

**Imaging Area** A drum imagesetter's imaging area is limited in both width and length by the diameter and length of the drum. These imagesetters typically accept wider film sizes than do capstan devices, which are limited by the tolerance to distortion at the edges of the imaging area. This distortion is created by the laser's being reflected at a steeper angle at the edges of the film. Typically these devices use narrower film than drum imagesetters do, but they can run longer lengths of film.



# Other Facts to Consider



**BEYOND THE** products Macworld Lab tested, there are other technologies and other companies to consider. In working with equipment this large and, frequently, delicate, we encountered some logistical obstacles. When you embark on your investigation, consider these issues.

First, although we invited every major prepress product vendor to participate in our testing, not all did. For a variety of reasons—including inventory issues, size problems, and sometimes (it seemed to us) just plain intransigence—we were unable to get products from prepress manufacturers Agfa (508/658-5600, <http://www.agfa.com>) and Purup Prepress (612/686-5600), as well as from drum-scanner manufacturers Juno Enterprises Imaging (612/780-3386) and Screen USA (847/870-7400, <http://www.screenusa.com>). As for DuPont (302/892-7299, <http://www.dupont.com/print>), its Crosfield scanners were above our spending limit for scanners, and it uses ECRM's imagesetter.

Nor was it possible to test every type of prepress technology, but that doesn't mean that what we didn't test isn't important. Herewith are brief descriptions of other relevant technologies to consider.

**Direct-to-Plate** Direct-to-plate technology saves labor and time by carrying out the RIP process directly on the plates used for printing. By eliminating a host of consumables, direct-to-plate can save money and the environment. However, platesetters are expensive—up to \$500,000—and without film, there's no provision for a viable contract proof. Thus, direct-to-plate is currently good for printing books, mono-

chrome manuals, and loose color, but requires a leap of faith for process-color work.

However, this is changing: the Optronics PlateSetter can print dot-for-dot proofs as well as plates, and similar devices from other vendors are likely to follow. Once reliably proofable direct-to-plate devices proliferate, they will likely supplant imagesetters.



**High-End Imagesetters** Imagesetters with larger imaging areas cost more than the devices we tested, but they can handle larger art formats—posters, for example. They also support larger printing presses: output from an imagesetter with a four-page signature will have to be stripped—at considerable expense—for an eight-page press. Consult with your printer before purchasing an imagesetter.

**Dry Imagesetters** Dry imagesetters output film without the need for a separate developing stage, thereby solving waste-management issues and reducing consumables. However, there is no standard: instead, there are three competing proprietary systems, each of which will lock you in to one media supplier. We fear this is a stopgap, dead-end technology—the real future is in direct-to-plate.

**Color Matching** The goal of color-matching systems is to provide uniformity of color at every stage of production, from on-screen representation to final output. Everyone agrees that

color matching is important, but few feel the current tools are ready for prime time. There are many competing systems, but most prepress operations work without one . . . for now. Robust and reliable color matching is probably around the corner, so keep a keen eye on developments in this field.

**Densitometers, Colorimeters, and Spectrophotometers** Densitometers measure total density; they don't distinguish color. Colorimeters measure the amount of color using RGB and/or CMY. Spectrophotometers analyze numerous evenly spaced bands of the visible spectrum, providing more reliable color data than colorimeters.

We recommend that you get a Mac-compatible spectrophotometer such as Light Source's (415/446-4200, <http://www.ls.com>) Colortron, X-Rite's (616/534-7663) Digital Swatchbook, or Color Savvy Systems' (513/748-9160, <http://www.colorsavvy.com>) ColorMouse. For quick density checks and simple imagesetter calibration, though, we suggest having a densitome-



Needed Input Digital cameras

ter handy, as it's faster than a spectrophotometer.

**Digital Cameras** As an alternative to scanners, digital cameras allow the photographer to shoot to a CCD (charge-coupled device) instead of film, saving valuable production steps. You can get a whole digital camera or a digital camera back that

works with the front end of a traditional camera.

Some digital cameras expose the CCD line by line, like a scanner. These cameras work best for still shots, at which they rival traditional cameras. Others expose the whole CCD simultaneously; they can capture motion well enough for many applications, but their technology is still not as fast as film, thus falling short for action photography.

**Film Processors** There's not much to film processors—you insert film at one end; it runs through developer, fixer, and wash; and it comes out developed at the other end. Today's processors automatically replenish chemicals from external tanks as needed. Because the big money is in the consumables, you can often get the dealer or vendor to throw in the processor for free, or at least to sell it at a discount.

**Proofing Equipment** There are multiple proofing processes, the most common being laminate proofs. In this scenario, contact frames sandwich film against photosensitive pigment sheets, which are then vac-

uum-sealed to create proofs. Once loaded, the frames are placed under an ultraviolet light source, exposing the sheets through the film. The next step in making a laminate proof involves exposing the pigment sheets in a process similar to developing film; the pigments are then transferred one by one from their sheets

to a piece of clear plastic. When all four of the pigments have been transferred to the plastic, it is laminated to a solid substrate, yielding the proof.

As with processors, the real profit for vendors is in the consumables, so you can frequently get frames, light sources, and processors gratis.



tom plumbing. Even then, every dollar's worth of chemicals costs another dollar for disposal. (*Macworld's* service bureau pays \$1500 per month for waste disposal alone.) For information on dry image-setters, which don't use chemicals, see the sidebar "Other Facts to Consider."

Other consumables cost money, too—especially film. Service bureaus report using 50,000 square feet of film in a typical month, at anywhere from \$1.30 to \$1.60 per square foot (depending on the film and the supplier). Even if you don't handle that volume, film costs can add up fast: lower volume means higher film prices. Add about 10 percent of your film cost for film and proof processing. Especially expensive: analog-proof materials, at just under \$4 per square foot.

What about obsolescence—will your system be worthless before it pays for itself? Again, it comes down to productivity. Service bureaus can, and must, keep up with the latest, greatest, and fastest because that's their life's blood. An in-house service bureau doesn't have to upgrade as often because it's not offering

a competitive service. Even so, as with your Macs, you'll need to upgrade your prepress equipment every few years.

Volume is clearly the primary determinant in your cost-benefit analysis. Yet many high-volume businesses still haven't taken prepress in-house. Why?

Control can be as much a burden as a boon. One West Coast department-store chain reportedly declined to internalize its prepress operations because the creative staff didn't want responsibility for the color quality, even though it would have meant a 50 percent reduction in the company's seven-figure advertising budget. Nor was the staff sanguine about becoming responsible for production time. A service bureau will stay open 24 hours a day; if you bring it in-house, you may have to also.

Above all else, the transition to an in-house service bureau requires unity of determination and effort. If the administrative, creative, and financial departments can't agree on a new direction, it will never happen. There are many obstacles to such agreement, but the biggest is

fear: if it doesn't work, you've got nobody else to blame. While prudence is wise when considering major expenditures, fear can also be costly: ultimately, if you can truly afford to internalize your prepress operations, you can't afford not to.

### Working in the Macworld Lab Color Space

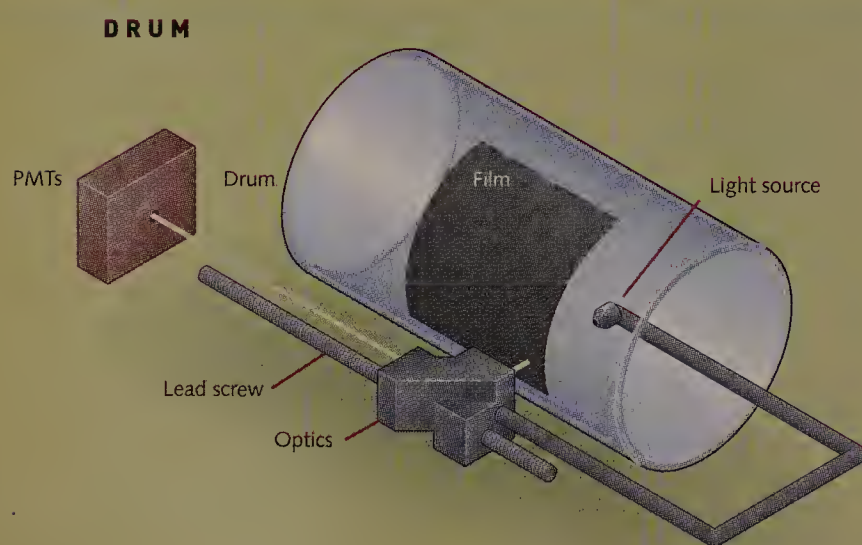
The big decision to internalize your prepress operations sets off a long chain of smaller purchase decisions. Toward that end, we did some prepress internalizing of our own in Macworld Lab. We assigned our three users at three levels of expertise a wide variety of prepress jobs, then scanned, digitally proofed, and imageset the jobs. Most of the results were impressive, but getting there wasn't always easy.

### Serious Scanners

The first stop in our Macworld Lab setup, naturally, was the input devices. The scanners used in prepress shouldn't be confused with tabletop flatbed scanners (see the diagram "More Than One Way

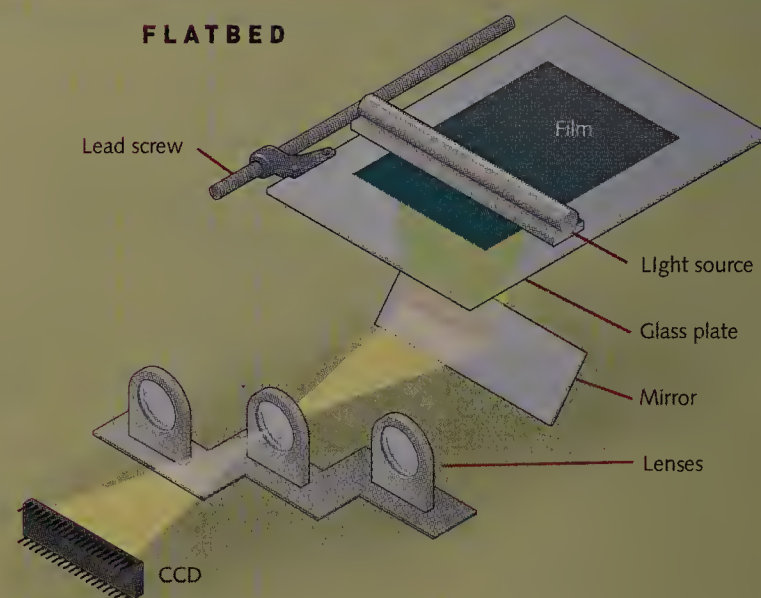
## MORE THAN ONE WAY TO GET A GOOD SCAN

Among popular high-end film scanners, there are two main types: drum and flatbed. Each is capable of excellent output, but they use different methods to achieve it.



**Mounting Film** With a flatbed scanner, just lay the film on the glass plate and you're ready to scan. Mounting film on a drum scanner takes a few minutes more—the drum spins very fast, so you must secure the film well. However, drum scanners are great for oil mounting (which reduces problems created by dust and scratches on the film) because bending the film around the drum creates tension in the film that holds it evenly against the glass. This helps create an even distribution of oil and reduce air bubbles (which can show up in the scan). Oil mounting on flatbed scanners isn't practical because a flat piece of film lacks the tension it needs to maintain an even layer of oil without air bubbles.

**Light to Data** Both types of scanners direct light through the film being



scanned, and both use optics that focus and direct the light. Drum scanners use photo multiplier tubes (PMTs) to convert this light into a digital signal; flatbed scanners use a linear charge-coupled device (CCD).

**Magnifying Images** When changing levels of magnification, both scanners maintain a 1:1 aspect ratio. To do this, drum scanners change the rate at which the optics scan across the drum as they change the frequency with which the PMT samples the image. (Scanning at a lower rate captures finer lines horizontally; higher-frequency sampling keeps the vertical density the same.) Flatbeds focus either one or many lenses to map a smaller or larger area of the film on the CCD. (When a smaller area is captured, a shorter movement by the step motor keeps the density of pixels the same vertically and horizontally.)



to Get a Good Scan"). There are high-end flatbed scanners that scan at better than 5000 dpi, and drum scanners that can get twice that. You need that level of performance to scan and enlarge small images at a quality suitable for glossy magazine or collateral printing.

You can spend from \$10,000 for a ScanView ScanMate Magic drum scanner to more than \$100,000 for a top-of-the-line drum scanner. A more expensive scanner doesn't necessarily mean you get better scans, though. Users we surveyed report results with midrange tabletop units that compare favorably with what they used to get from service bureaus.

Still, larger drums enable the big scanners to handle larger originals or take more small originals at once, making them more versatile and efficient. If you can keep those drums filled, consider a large-format drum scanner. Otherwise, a good tabletop unit will give you equivalent quality for less money (see the table "A Panoply of Prepress Products" for pricing comparisons).

Scanners and scanning software require extensive operator interaction, making the interface as critical to your work—and your buying decision—as scanning quality. We found differences in scan quality among the four scanners we examined, but the biggest differences are in the user experience.

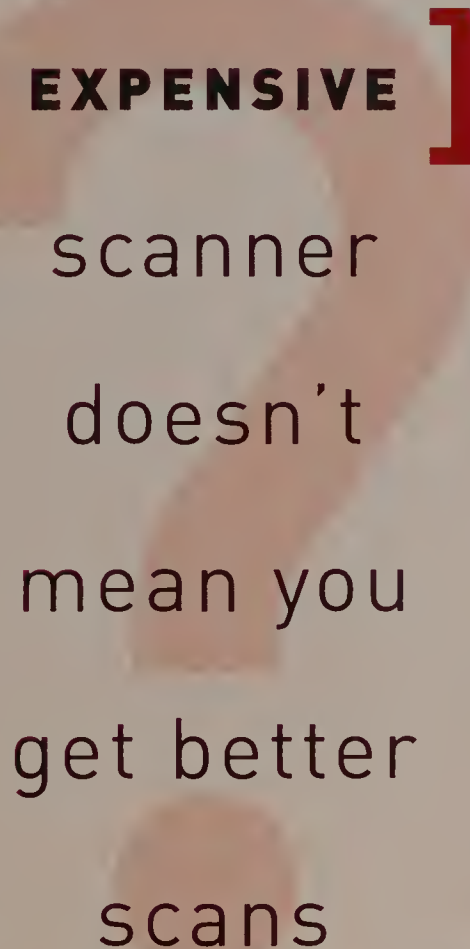
The ScanView ScanMate 3000 is the most frustrating to use. Its nonremovable drum puts a bottleneck on production and requires that art be taped to the drum while it's in the scanner—an awkward procedure. The lack of backlighting makes mounting even harder and prohibits checking prescan edits against the original. (The ScanMate 3000's big brothers—the ScanMate 4000 and ScanMate 5000—have removable drums.)

ScanView's un-Mac-like ColorQuartet software requires you to launch two background processes—Sepproc and Scanproc—before the main application, then to link the programs through a dialog box. Scanning controls are poorly designed and organized. For selecting a scan area, instead of an overview of the drum, ColorQuartet displays a blank grid. Sharpening is just a coarse setting from 1 to 24. Most image-manipulation controls are similar to Photoshop's controls or comparably intuitive, but you can't see black or white points on an image, nor can you manually select them other than

by entering density values. Worse, the Revert to Original command isn't clearly labeled, and offers no alert before zapping your edits.

As we worked, the Preview windows shrank with each successive scan until they were too small to see. Neither the software nor the slim manual offered help. We finally fixed this by giving more memory to the Scanproc background process—not exactly an intuitive action.

ColorQuartet scans in the CIELAB color space and has fine color lookup tables (CLUT), netting good color results, especially for our test negative.



## A more [ **EXPENSIVE** ] scanner doesn't mean you get better scans

However, random scans were poorly focused. At \$19,995, this is one of the least expensive drum scanners on the market, but we still expect hardware and software design at least as good as what we've seen with low-cost scanners.

In contrast to the ScanView, the Optronics (<http://www.intergraph.com/optronics>) ColorGetter 3 Pro Turbo is a serious professional tool. Its removable drum—a feature of all better drum scanners—makes mounting art relatively easy, though tight quarters hinder removing and replacing the drum, and a lack of internal lighting prevents comparing the

original with the prescan.

Optronics' ColorRight software can quickly generate an overview for cropping prescan selections. Frustratingly, ColorRight has no resizable crop tool—a significant oversight. Fortunately, all of ColorRight's other tools are strong. The sharpening controls are particularly flexible, and a test scan feature lets you perform a fast side-by-side comparison of all image-editing settings. ColorRight also offers a full complement of easy and powerful color-correction tools, although the slider controls are awkwardly un-Mac-like. More seriously, some saturated colors in ColorRight's CMYK composite display were rendered less faithfully than in the RGB viewing mode. Optronics is working on a solution.

ColorRight lets you create and save scanning parameters in Scan Sets. A crop's parameters can be called up from the job queue, edited, and stored back over the original or used as the starting point for a new prescan. For easy scan ganging, you can save sets for multiple drums. Job queue functions could be more intuitive, but all our users felt they'd be easy enough to learn over time.

The ColorGetter is fast, and scanning feedback is excellent. We were also very happy with the scan quality for all types of originals, except for our color negative. ColorRight offers three CLUTs for different film types, but none gave us acceptable results.

We'd like to see Optronics fix the few problems we found and add CIELAB color support, but the ProTurbo is still a fine scanner. The ColorGetter 3 series runs from \$35,750 to the \$47,450 model we tested, differing primarily in drum size. If you've been lusting after a big, expensive drum scanner, the Optronics ColorGetter 3 Pro Turbo will get you most of the way there.

While drum scanners boast the highest scanning resolutions, their flatbed cousins also have advantages, especially for those used to working with desktop scanners. Mounting originals on the Linotype-Hell Topaz's stationary flatbed is simplicity itself: just put them on the glass. The scanner focuses with each line, so transparencies need not be flat—as long as the distortion is perfectly parallel to the scan line. An integrated device to flatten originals would be better.

The software was easy to use, being comfortably Mac-like. Monitor calibra-



A Panoply of Prepress Products

SCANNERS

Company	Product	List Price	Phone	Specifications			
				Technology	Image Area (in inches)	DPI	Density Range
Linotype-Hell	Topaz	\$49,000	516/434-2000	flatbed	12 × 8 (reflective) and 8 × 10 (transparency)	5080	3.7
	Product-Line Siblings (not tested)						
	Saphir	\$4250		flatbed	8.4 × 11 (reflective) and 8.3 × 10 (transparency)	600-1200	3.0
	Opal	\$9900		flatbed	17 × 6	800-1600	3.0
Optronics	ColorGetter 3 Pro Turbo	\$47,450	508/256-4511	drum	11 × 15 (reflective and transparency)	8128	0-4.0
	Product-Line Siblings (not tested)						
	ColorGetter Falcon	\$29,750		drum	10.5 × 12	5418	0-4.0
	ColorGetter 3 Prima Turbo	\$35,570		drum	8 × 10	8128	0-4.0
	ColorGetter 3 Plus Turbo	\$41,450		drum	10.5 × 12	8128	0-4.0
ScanView	ScanMate 3000	\$19,995	415/378-6360	drum	8.5 × 11.5	3000	3.6
	Product-Line Siblings (not tested)						
	ScanMate F8	\$39,995		flatbed	11 × 17 (reflective) and 8.5 × 17 transparency	4000	3.7
	ScanMate Magic	\$9995		drum	8.5 × 11.5	2000	3.0
	ScanMate II	\$14,995		drum	8.5 × 11.5	2600	3.6
	ScanMate 5000	\$34,995		drum	8.75 × 12	5000	4.0
	ScanMate 11000	\$49,995		drum	8.75 × 12	11,000	4.0
Scitex	Smart 342	\$53,450	617/275-5150	flatbed	11.8 × 17 (reflective) and 10 × 17 (transparency)	5260	3.7
	Product-Line Siblings (not tested)						
	Smart 320, 320L	\$29,950		flatbed	11.8 × 17 (reflective) and 10 × 17 (transparency)	5260	3.7
	Smart 340, 340L	\$38,450, \$48,450		flatbed	11.8 × 17 (reflective) and 10 × 17 (transparency)	5260 (1920 linear)	3.7
	Smart 342L	\$63,450		flatbed	11.8 × 17 (reflective) and 10 × 17 (transparency)	5260 (2300 linear)	3.7

COLOR PROOFERS

Company	Product	List Price	Phone	Specifications			
				Technology	Output	DPI	Colors
Imation	Rainbow 2720	\$18,500	612/737-6501	dye-sub	LA, WB	300	3, 4, monochrome
	Product-Line Siblings (not tested)						
	Rainbow 2730	\$19,500		dye-sub	A4, LA, LB, WA	300	3, 4, monochrome
Tektronix	Rainbow 2715	\$9995		dye-sub	11.95 × 17.4	300	3, 4, monochrome
	Phaser 480X	\$14,494	503/682-7377	dye-sub	A3, A4, letter, tabloid B, tabloid extra	300	3, 4, monochrome
	Product-Line Siblings (not tested)						
	Phaser 300x	\$7995		solid ink	4 × 6 to 12 × 18	300	3, 4, monochrome
	Phaser 440	\$7995		dye-sub	letter extra, 8.5 × 11 full blend	300	3, 4, monochrome

IMAGESETTERS

Company	Product	List Price	Phone	Specifications			
				Technology	Image Area (in inches)	DPI	
ECRM	ScriptSetter VR36	\$29,500	508/851-0207	infrared	14	1000-2540	
	Product-Line Siblings (not tested)						
	ScriptSetter VR30, VRL30	\$21,500		infrared, visible red	12	600-2540	
	ScriptSetter VR36/HS, VRL36/HS	\$39,500		infrared, visible red	14	1000-2540	
	ScriptSetter VR45, VRL45	\$44,500		infrared, visible red	18	1000-2540	
	ScriptSetter VR45/HS, VRL45/HS	\$54,500		infrared, visible red	18	1000-2540	
	Knockout 4550, 4550L	\$70,000		infrared, visible red	18	1000-2540	
Linotype-Hell	Linotronic Mark 40	\$36,000	516/434-2000	infrared	12.2	800-3000	
	Product-Line Siblings (not tested)						
	Linotronic Mark 10	\$23,000		infrared	12.2	133	
	Linotronic Mark 30	\$32,500		visible red	15.75	150	
	Linotronic Mark 40EX	\$39,900		infrared	15.75	800-3000	
ScanView	DotMate 4000	\$39,000	415/378-6360	visible red	14 × 18.5	900-3600	
	Product-Line Siblings (not tested)						
	DotMate 5000P (processor)	\$75,000		visible red	16.5 × 22	900-3600	
	DotMate 5000SA (stand-alone)	\$56,000		visible red	16.5 × 22	900-3600	



tion was a chore, but the tools are good, and Linotype-Hell offers a full line of robust, systemwide color calibration packages as an option. The JobAssistant application handles job and file management adequately, but even our expert user found it hard to tell precisely what job was being done at any given time, and where its files were stored. The main application, LinoColor, works in the CIELAB color space and has effective tools with extensive documentation.

All this adds up to a strong product. However, reflective-art scanning time was excruciatingly slow—a 45-percent reduction of an 8 by 10 took five minutes, compared with less than a minute for the other scanners. Also, LinoColor provides no prescan feedback for sharpening—you must complete a scan to see the effects of your choices. This is a ludicrous omission in a \$50,000 scanner.

The Scitex (<http://www.scitex.com>) Smart 342 was the most pleasant scanner to test. The hardware was a cinch to use, once we got used to having to return the moving flatbed to its home position before opening the scanner.

This scanner uses flat black plastic carriers with precut frames for mounting originals. These are available for all popular formats, and there's a template for cutting your own custom carriers. If you perform many scans a day, it's like having a stock of extra drums at a fraction of the cost. Bar codes on the templates let the scanner automate the preview process, so the user can start work on the first image while the other prescans are being done.

All the software tools were powerful and intuitive. Job management was the best of the lot. We were really impressed with the workflow orientation of this package: the transparency of operation enhances productivity at no expense in scan quality. At \$53,450, the Smart 342 is the most expensive scanner we tested, but you get your money's worth.

Our novice and intermediate users preferred the Scitex, and our expert recommended it for those unfamiliar with high-end scanning. Our panel overwhelmingly preferred the Scitex scans as well. However, we feel this reflects ease of use more than the potential of this product to generate good scans.

With more extensive training and experience, we'd have gotten greater detail from the ColorGetter—our expert's first choice for experienced high-end

scanner operators. Likewise, the Topaz scans did poorly in our subjective evaluation, but we later discovered that was because the LinoColor software overrode our monitor-calibration settings without indicating it had done so.

As an alternative or addition to scanners, you can use digital cameras for input. They have distinct advantages and limitations (see the sidebar "Other Facts to Consider").

#### **Proof Positive**

After editing images and creating your document, you'll want to check your work

# Calibration

## is

### [ CRITICAL ]

## to getting

## accurate

## colors

with a printed digital proof. Soft proofing colors from an RGB display can't precisely match what you'll get from process printing, and you can't adequately simulate different printing technologies and separation standards without a laminate proof. There are laser (the Canon Fiery) and ink-jet (the Scitex Iris) proofers, but we limited our testing to two dye-sublimation proofers (see "Full-Proof Printers," *Macworld*, January 1996).

Both the Imation (<http://www.imation.com>) Rainbow 2720 and the Tektronix (<http://www.tek.com>) Phaser 480X are based on the same Mitsubishi engine and

are easy to set up. The Rainbow is a SCSI device that requires a host computer to run Adobe's Configurable PostScript Interpreter (CPSI) application as a software RIP. You can access the Rainbow on a network via the host Mac. The Phaser 480X has a built-in PostScript interpreter and RISC processor, and can be networked directly via Ethernet.

Calibration is critical to getting accurate colors—the *raison d'être* of a digital proofer. The calibration processes for these devices are similar. 3M has values for each lot of ribbons to account for differences in dye densities; you can download them from its BBS and plug them into CPSI. As an option, you can get a calibration kit. (A calibration kit ships standard with the Phaser 480X.) These kits let you compare printed test documents of gray shades against a reference template, and then enter the values of the closest matches. Although never 100 percent satisfied with the colors we viewed in our D50 light booth (which has 5000 degrees Kelvin lighting for reference color checking), we got close enough with both units for practical process-color proofing.

To evaluate the proofers, we printed Adobe Illustrator and Photoshop test images and compared them with laminate proofs. Our panel rated each sample against the reference for color accuracy, weight, gray balance, and blends. They found the proofs to be virtually equal—not surprising, given the identical print engines—leaving us with no output-quality preference. Other qualities made a more distinct impression.

The Phaser 480X has some pluses. It includes the calibration kit and is slightly easier to use (though after calibration, both proofers are as hassle-free as any printer). It's also faster; in previous tests, the Phaser 480X's integrated interpreter easily outpaced the Rainbow 2720 with 24MB of RAM allocated for CPSI on a Power Mac 7100/80. A faster host Mac with more RAM allocated to CPSI will close the gap . . . and drive up the price of the Rainbow proofing system considerably. While it's possible to run other programs on the host Mac, you can expect a performance hit. Better to have a dedicated CPSI Mac, or to use it as an auxiliary workstation between print jobs.

The Rainbow 2720 has the widest range of proofing options, giving it an edge in versatility that led *Macworld* to select it as Editors' Choice in our last



roundup of color printers ("Full-Proof Printers," January 1996). The Phaser 480X comes close, though, and ultimately will cost you less—but not by as much as the base price would lead you to believe. To use the Phaser's advanced proofing options, you have to upgrade the RAM from the default 32MB to 96MB, which brings the cost of the Phaser up to the price of the stock Rainbow. Don't forget to add in the cost of a CPSI host Mac and its RAM, though.

### Setting the Right Image

Once you're satisfied with your digital proof (or right after creating your document, if your workflow doesn't include digital proofing), it's time to send your files to an imagesetter, which prints every page to four pieces of film: one for each CMYK color. We tested three units, all using the same Harlequin (617/374-2400, <http://www.harlequin.com>) ScriptWorks RIP, and examined the Scitex Dolev RIP on a Macintosh (although Scitex did not provide a Dolev imagesetter).

The RIP takes incoming files—such as PostScript instructions and compressed graphics—interprets them, and converts them into giant bitmaps, which it then sends to the imagesetter. As you'd imagine, identical RIPs lead to virtually identical results. What differences we observed can be traced to different default screen settings. Specifically, our panel preferred the elliptical dot shape used by the Linotype-Hell Linotronic Mark 40 to the Euclidean dot shape used by the ScanView DotMate 4000 and the ECRM ScriptSetter VR36. Simply by changing dot shape, we could have produced nearly indistinguishable matches. You should examine the different screening options; ask your printer for recommendations and pick the best for your needs.

A more significant difference between imagesetters is in their imaging technologies. Both the Mark 40 and ScriptSetter are capstan devices, while the DotMate is drum-based (see the diagram "Two Different Ways to Image Film"). Capstan devices are less precise and prone to advancing the film inconsistently, causing registration problems. The DotMate was slower than the other imagesetters, but the drum's registration precision makes the trade-off worth it.

However, we didn't like the Windows NT server that came with the DotMate, compared with the other imagesetters'

Mac servers, nor did we care for the one-button hardware interface that ultimately didn't work; we had to send command-line instructions from the server. The DotMate server didn't even come with AppleTalk drivers installed—we had to request them from ScanView.

Both the Harlequin and Dolev RIPs are easy to configure and produce fine results. Our expert considers the Dolev RIP's screening algorithms superior. However, changing the Dolev RIP settings is relatively awkward: you need to run a utility for each job that requires different settings, while the Harlequin

We  
mixed and  
matched  
brands and  
found no  
[COMPATIBILITY]  
problems

RIP lets you publish setups as separate Chooser devices.

What we really like about the Dolev RIP is the bundled Full Auto Frame trapping software. It puts the trapping capabilities of QuarkXPress to shame, and the automation means you can have the computer do all the work while you're expending your labor elsewhere. Combined with one of Scitex's drum-based Dolev imagesetters, this a strong contender.

At this point, you develop your film in a processor. Some imagesetters have in-line film processors, saving you a separate developing step. For example, some Sci-

tex Dolevs automatically cut pages, requiring you to feed film into a processor manually, a page at a time. The optional in-line processor is a must for productivity with these units. You create analog proofs from the processed film, and once they're approved, you're ready to ship your film to the printer.

The major vendors offer soup-to-nuts systems. There are definite advantages to buying a system this way; having a single service vendor who can't blame somebody else's gear is a substantial one. However, you can still buy separate components just as you do for desktop systems. We mixed and matched brands in our tests and encountered no compatibility problems.

### Betting Your Bottom Line

Will internalizing prepress operations give you a competitive advantage? The answer to that depends on the volume and complexity of your prepress needs. One thing's for certain: it may already be working for your competitors.

Any business with a sufficiently large publishing arm—from newsprint advertising to books—can benefit. Department stores and large advertising agencies are obvious candidates, but ultimately the type of business is irrelevant. It's what you spend on service bureaus now that determines how much you can save by building your own. If you have the volume, the capital, and the will, now's the time to start shopping.

That doesn't mean it's time to buy. The vastness of the undertaking dictates careful, long-range planning. Starting small—say, just buying a scanner—may seem a viable option, but the real benefits hinge on having a whole system. If you're going to do it, spend the time and money necessary to do it right.

If you don't get the ball rolling now, though, you'll still be debating your plan while your competitors are speeding along on debugged systems. The in-house service bureau is a small part of the present-day publishing world, but it's the wave of the not-too-distant future. Be ready to catch it when it comes. **m**

PETER M. STOLLER ([AFCPeterS@aol.com](mailto:AFCPeterS@aol.com)) still writes with stone tablets and chisels, because they don't need upgrades and they never have system crashes. JEFF SACILOTTO, a service-bureau alumnus, is a senior technical analyst for Macworld Lab. Additional research was provided by senior editor HOWARD BALDWIN.



“ It’s totally changed  
my perception of reality. ”



*“I alter reality for a living. It’s my art. I’m literally changing the world – at least on my screen. Adaptec’s PowerDomain™ PCI SCSI cards are helping me change things faster than ever before. It’s their I/O performance. When you work in digital art, the files are massive. Moving them around fast, opening them high resolution. A faster process-pipeline between your system and*

**– Robert Bowen**  
*Robert Bowen Studios, New York*

*fast, that’s what it’s all about. Now my files just pop right up – at a speed that can only help so much. At some point you’ve got to make the rest of all your peripherals wider. My pipeline is powered by Adaptec.”*

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Your strategy for working

wherever and whenever you want





**E**xtra spare time—that's what personal computers were supposed to give us when they were first introduced. By handling such tedious, time-consuming tasks as mail merges and database sorts, computers would free us to leave work early and squeeze in a round of golf, right?

Not exactly. Thanks to computers, many of us are working harder than ever. And as for that extra golf game, the only links you're likely to encounter during the week are of the hypertext variety. While computers certainly aren't giving us extra leisure time, they have at least brought about one positive lifestyle shift: the ability to telecommute—to work wherever, whenever we want.

Telecommuting offers many benefits—every-



# MAKE TELECOMMUTING A REALITY

by

James A.

Martin

thing from increased employee productivity to reduced freeway traffic. But those advantages are elusive if you use the wrong tools. To be as productive as possible when away from the office, you need, at a minimum, a powerful Macintosh equipped for remote access, remote control, and E-mail.

For this article I evaluated a variety of tools, from the basic (Apple Remote Access) to the complex (an Integrated Services Digital Network, or ISDN, line), to see which ones offer the biggest benefits from a telecommuter's perspective. For instance, several programs reviewed here, such as SoftArc's FirstClass and CE Software's QuickMail, consist of both client and server components, but I've evaluated only the client software, as a telecommuter ordinarily wouldn't use the server component. In addition, the sidebar "Tips for Telecommuting" offers advice that you and your employer can use to get the most from your tools.



## REMOTE ACCESS: QUICKEST ROUTE TO THE OFFICE



**R**emote-access software, which gives you the ability to tap into resources such as printers and other computers residing on the office LAN, is the telecommuter's most essential tool. Using remote access is like being in two places at once—you're tapping away on your Mac keyboard at home to search those database files at the office.

Remote-access software can be as basic as Apple Computer's ARA 2.0.1, or Apple Remote Access (408/996-1010, <http://www.apple.com>), a client-server communications technology designed to offer remote access to an AppleTalk-compatible network via an ARA server. Or it can be as multifunctional as Farallon Computing's Timbuktu Pro for Networks 2.0, a remote-control application that lets you take control of a remote Mac, opening applications and files and performing other tasks almost as if you were sitting at that computer.

**Access Baseline** Using the ARA client software, a modem, and a telephone line, you can tap remotely into shared network resources such as printers and other Macs. Those resources appear as double-clickable icons on your Mac's desktop.

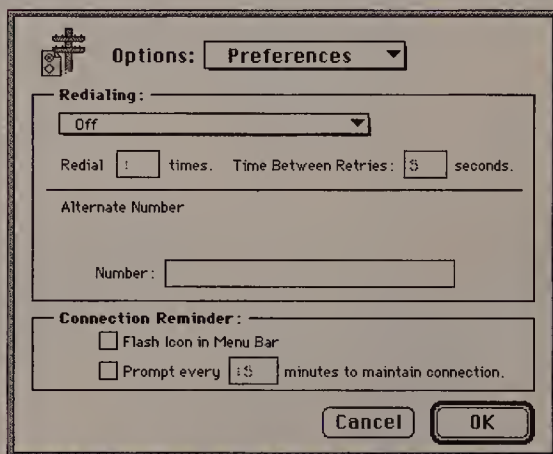
ARA is a popular way to run some client-server applications remotely—CE Software's QuickMail in particular. With the QuickMail client on your PowerBook, you can dial in to an ARA-compatible QuickMail mail server and pick up your messages much more efficiently than you could using QuickMail Remote (Remote doesn't offer all the features of the regular QuickMail client, and the direct dial-in doesn't give you ARA's file-sharing benefits).

You could also use your ARA connection to query LAN-based databases such as Claris's FileMaker Pro, but the wait to

retrieve large chunks of data over regular dial-up telephone lines—versus the faster Ethernet or other networks in an office—can be excruciating.

ARA is simple to understand and easy to use, but limited. ARA's DialAssist, which streamlines the dial-in process when you're traveling, is handy—but that's about it in terms of features. To get more mileage out of ARA, I'd recommend Trilobyte Software's ARACommander 2.0.3 (513/777-6641; \$35, single user). ARACommander is a useful control panel that among other things lets you generate a variety of automatic, regularly scheduled ARA connections.

**ARA: Summing Up** If all you need is a remote connection for E-mail and occasional access to a shared volume on a company LAN, then all you need is ARA. It's easy, simple, and reliable. And in the near future, ARA should offer a few more features and capabilities. Version 2.1 of the client, due to ship by the time you read this, supports ISDN connectivity. And ARA 3.0, due to ship later this year, promises to support the Point to Point Protocol (PPP) via Open Transport—which should enable remote users to log on to an AppleTalk network, such as the company's LAN, and a TCP/IP network, such as the Internet, at the same time.



**ARA versus ARACommander** Apple Remote Access (top) offers only a few connectivity preferences, while Trilobyte Software's ARACommander (bottom) lets you schedule connections in advance.

**Advanced Access** Farallon's Timbuktu Pro does ARA one better as the only Mac application that combines remote-access and remote-control capabilities for both Macs and Windows PCs. With this program you can dial in to the company LAN via an ARA connection, an ISDN line, or the Internet, and take control of a remote Mac or Windows PC residing on your company's AppleTalk, Novell IPX, or TCP/IP-compatible network. During a Timbuktu Pro session, you can see the remote computer's complete desktop in a window on your screen, and—it almost gets metaphysical—you can perform many tasks, such as transferring files, launching applications, and querying databases, as if you were actually sitting at the keyboard of that remote computer.

Because Timbuktu Pro is a remote-control application, the actions you take on a remote Mac—such as running an application—are handled by that Mac's processor. That's a more efficient way of performing tasks remotely than ARA's remote-node strategy, which forces data to be transferred over the dial-up connection first, then processed on your Mac.

Timbuktu Pro's remote-control architecture offers other advantages as well. You can engage in two-way collaboration on documents with other Mac and Windows users, for starters. A colleague at the office using a Windows PC can call you at home, for instance, and tell you that the budget forecasting for next year has just been completed using a Lotus 1-2-3 spreadsheet. Despite the fact that you're using a Mac and you don't have Lotus 1-2-3, you can view the spreadsheet in a scrollable window on your screen by initiating a Timbuktu session. Whatever actions the colleague takes on the remote Windows PC—recalculating some figures, say—are mirrored on your Mac display. And with the right access privileges, you can use your Mac to take control of that Lotus spreadsheet and tweak a few numbers on your own.

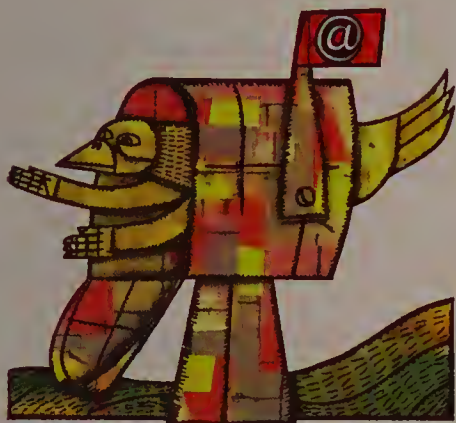
The remote-control capability is a convenience that goes beyond the ability to peer into spreadsheets. When you're experiencing mysterious technical glitches on the road, your company's tech-support guru can remotely control and diagnose your system and, with luck, fix any problems.

**Timbuktu Pro: Summing Up** Initially I found Timbuktu Pro tricky to learn—



the manual is bereft of tutorials, and the setup procedure and user interface couldn't be described as intuitive. The address-book feature is fairly basic (see *Reviews, Macworld*, May 1996, for more on that subject). And even though Timbuktu Pro can access remote Macs more directly than ARA can, it's still far from a "real-time" experience—dragging an icon across a remote desktop in Timbuktu Pro, for instance, can feel like trying to jog in waist-deep water. Still, if you must regularly access applications and large files on the network, and you're worried that your Mac will misbehave while you're traveling, you need Timbuktu Pro.

## SENDING E-MAIL TO THE OFFICE



Successful networking isn't just about remote access and remote control, it's about staying in touch with colleagues and clients in a timely way. For that, you need E-mail, whether it's a client program (such as QuickMail) that's part of a client-server, company-wide E-mail system, or an application (such as Claris EMailer) designed just for handling E-mail over the Internet and online services.

**Company-Wide E-Mail** QuickMail 3.6, the market leader in enterprise-wide Mac E-mail, provides the same functionality via ARA as you'd get using QuickMail in the office. Lotus Development's cc:Mail Mobile for Macintosh 2.0, which began as an E-mail program for Intel-based PCs, is a frequent choice among PC network administrators who also have Mac telecommuters to support. The Mac version isn't identical to the PC version, however, and the mobile program doesn't offer as many features as you'd get using cc:Mail directly on a LAN.

A third application, SoftArc's FirstClass 3.11, is a hybrid E-mail, conferenc-

ing, and BBS environment for Mac and Windows users. Originally developed for the Macintosh, FirstClass is essentially a feature-rich E-mail package that also offers, among other things, the ability to create and participate in company- or department-wide online conferences—a feature that is often found in more expensive and complex groupware applications. Here's how the programs compare in key areas.

### **Sending and Receiving Messages**

When creating messages, QuickMail forces you to go through steps the other programs don't require. You must first choose a form (such as Office Memo, FYI note, or a custom form); you can't select a frequently used form as your default. To address a memo, QuickMail requires that you select the recipient's name from an address book.

In comparison with this process, sending messages with cc:Mail Mobile is lightning-fast. cc:Mail Mobile uses only one form—how many do you *really* need for remote E-mail, anyway? To address a memo, you begin by typing the recipient's name in the appropriate field; if the recipient is in your cc:Mail directory, the program finishes the addressing for you automatically.

Of the three programs, FirstClass's approach to sending messages is the most efficient because it sends and receives in the background, freeing you to engage in online conferences or to search FirstClass bulletin boards—a great time-saver for harried telecommuters. In QuickMail and cc:Mail Mobile, you have to wait until a message finishes transmitting before you can perform another task in the program.

cc:Mail automatically drops your connection once it has sent and received messages; to reply to a message, you have to reconnect, which can be quite irritating. You can, however, write messages offline and store them in the out-box; when you connect, all those messages are transmitted automatically. If messages are waiting for you, they download to your hard drive automatically in the same session. But once those two events occur, the connection is automatically severed.

**Transferring Files** All three programs do a reasonably good job of getting files from point A to point B. But again, with FirstClass, the time required to upload or download isn't terribly important, since you can continue working while a file is being transferred.

**Managing Mail** QuickMail's mail-management feature, introduced in client version 3.0, brought a number of flexible message-handling benefits to the program, such as the ability to file incoming messages automatically by subject or other criteria into specified folders. But QuickMail becomes consumed with the task of filing messages into folders, and you're forced to wait until the task is completed before you regain control of the application.

cc:Mail Mobile offers the fewest mail-management features. You can set up folders in your out-box, then drag and drop files into them for storage—but that's about it. Also, cc:Mail automatically downloads your incoming messages to your hard drive, while QuickMail and FirstClass keep them stored on the remote server. While cc:Mail Mobile's method reduces server storage requirements, it also makes it difficult to maintain one consistent in-box—the messages you read while traveling will reside on your PowerBook in-box, for instance, and mail received while you're at your office Mac will be downloaded to that in-box.

### **Company-Wide E-mail: Summing Up**

If you work for a company that primarily uses Windows PCs, and you only need to connect to the LAN for sending and receiving messages and files, cc:Mail Mobile should suit your needs.

QuickMail is a competent, if at times inefficient, program, and it continues to add attractive new features for telecommuters. Version 4.0 (scheduled to ship later this year), for instance, will offer remote dial-in to a QuickMail server via the Internet and the ability to create messages offline and automatically send them when reconnected.

FirstClass's messaging features make it the best, albeit not a perfect, choice. The program's navigational controls could use some tweaking—you can't notify users in a conference if a message is urgent, for instance; all they see is a post-office box flag indicating that a new message has arrived. Nonetheless, FirstClass ventures into the realm of groupware while maintaining the ease of use and the efficiencies of a simple E-mail program—a difficult feat to pull off.

**E-mail over the Internet** For small businesses, one of the simplest ways telecommuters can stay in touch with colleagues is to set up an account with an online service (such as CompuServe, 614/



## TIPS FOR TELECOMMUTING

**H**andling your job from home can be heaven for telecommuters, but it can be quite another experience for information services managers and administrators, who somehow have to support employees when they're off-site. Here are some strategies for keeping telecommuting as productive—and as cost-effective—as possible.

**Test first** Have telecommuters test their Macs and remote connections in the corporate office before connecting from home or on the road. This gives telecommuters the chance to get setup help where it's easily available.

**Use like modems** Whenever possible, give the telecommuter the same 28.8-Kbps modem model the company uses on its mail or other remote dial-in servers. Variations between 28.8 modems' handling of the V.34 standard can compromise connectivity speeds.

**Dedicate support** Designate one or more tech-support staffers to act as liaisons to off-site workers, particularly if the telecommuters are frequently relying on new technologies, such as ISDN or videoconferencing.

**Use fast Macs** Telecommuters are often more productive when away from office distractions, so don't saddle them with older, slower Macs for use at home or on the road. If need be, give telecommuters slower Macs for the office—where they can take advantage of Ethernet-network speeds—and faster ones for use outside the office, where they're at the mercy of slower, dial-in telephone-line connectivity speeds.

**Consider ISDN needs** Having the best equipment is particularly important for telecommuters considering ISDN connections. ISDN's top speed, when two B channels are combined, is 128 Kbps. The serial port speeds in 680X0-based Macs max out at 57.6 Kbps, however. To get the most from ISDN, the telecommuter needs a Power Mac or Quadra AV Mac,

which can sustain top serial-port speeds of 250 Kbps. Another option: consider a two-port NuBus expansion card from Creative Solutions (410/766-4080, <http://www.scsn.net/csi>).

**Plan for remote diagnostics** Telecommuters often can't diagnose the technical problems they're experiencing on the road. If that's a particular concern for your company, you need a remote-access communication server-and-software system, such as Shiva's (617/270-8300, <http://www.shiva.com>) LAN-

Rover, that can keep detailed logs of remote-user access. It includes software to keep detailed logs for troubleshooting, security, billing, and other purposes.

**Go beyond ARA** Sometimes it makes sense for telecommuters to use an Internet service provider (ISP) account for E-mail, file exchange, and access to corporate information, instead of an ARA connection to the company LAN.

For example, a Los Angeles-based company with a salesperson in Dallas could give that employee an account at a Dallas-based ISP for about \$20 a month, with unlimited access time. That way, the Dallas employee could exchange E-mail with the California office using the Dallas ISP's local phone number, instead of relying on an 800 or long-distance number, for which the home office would be charged by the minute.

**Consider intranet option** Also, if your company already has a public Web site that's maintained on an in-house, secure server, you've got the basis for an intranet—effectively, a Web site for access only by corporate users with passwords. Remote users can dial in to the company Web site via their local ISPs and download corporate information without racking up phone charges. With a program like Farallon Computing's Timbuktu Pro for Networks, they can access shared resources on the company LAN through an Internet connection as well.





529-1349, <http://www.compuserve.com>; or America Online, 703/448-8700, <http://www.aol.com/>) or an Internet service provider (ISP). At a relatively low cost—CompuServe's and AOL's basic monthly fees are \$9.95; most ISPs charge about \$20 per month for unlimited access—you can send E-mail messages and file enclosures to just about anyone, anywhere.

The two most popular applications for handling E-mail over the Internet are Claris EMailer 1.03 and Qualcomm's Eudora Pro 2.1.2. (A third, Eudora Light, is a freeware application that offers only the most basic features of Eudora Pro.) Here's how EMailer and Eudora Pro shake out.

**Sending and Receiving Messages** Claris EMailer is the only application that can send and receive messages to multiple online services. Eudora Pro can only handle messages sent over the Internet.

In my pre-EMailer days, the first thing I did every morning was check messages on America Online, CompuServe, *Macworld's* QuickMail server, and over the Internet—one service at a time. No longer; Claris EMailer now makes most of

time you read this, will add support for AppleLink and Claris's new OfficeE-mail application (company's estimated price, \$299)—an enterprise-wide client-server E-mail application, à la QuickMail, with the ability to send and receive messages over the Internet as well. It's primarily aimed at small businesses that don't need or can't afford QuickMail, but need something more robust than EMailer alone.

**Addressing Messages** EMailer's address book lets you import addresses from your various E-mail accounts easily. The feature could use some refining, though. You can only arrange the address-book names and descriptions in alphabetical order, for instance; a better option would be the ability to drag and drop names into whichever arrangement suits you. (You can locate addresses quickly by typing in the first few letters of the addressee's name, however.)

To store names and E-mail addresses in Eudora Pro, you're asked to assign each person a "nickname" (a short descriptive term). Version 3.0, which should be available by the time you read this, calls the nicknaming feature an address book and makes some minor, but welcome, interface changes. Nonetheless, it's still the same old nicknaming feature, and while it's convenient, it lacks the address importing and other benefits of a real address book.

**Message Handling** EMailer's message-handling features are extremely flexible. You can select a particular online service as your default connection for sending all messages, for instance, yet you can still select a different service for each outgoing message. You can give messages any of nine priority levels. And to save on Internet access fees or toll charges, you can set up EMailer to send and receive messages when rates are low.

Eudora Pro has robust message-handling features, too, such as the ability to set up multiple mailboxes into which you can directly transfer incoming messages. Eudora Pro lets you create folders within mailboxes for further organization, and you can assign color-coded labels and priorities to messages as well.

**E-mail over the Internet: Summing Up** For those who only need E-mail over the Internet, Eudora Pro 2.1.2 is a solid choice. And version 3.0 will offer a number of attractive new features, such as font styling, an improved interface, and the ability to include active URL links within

messages. Most telecommuters I know, however, have more than one E-mail account—and to cope with that situation, there's simply no better option than Claris's innovative EMailer.

## TROUBLE ON THE ISDN LINE

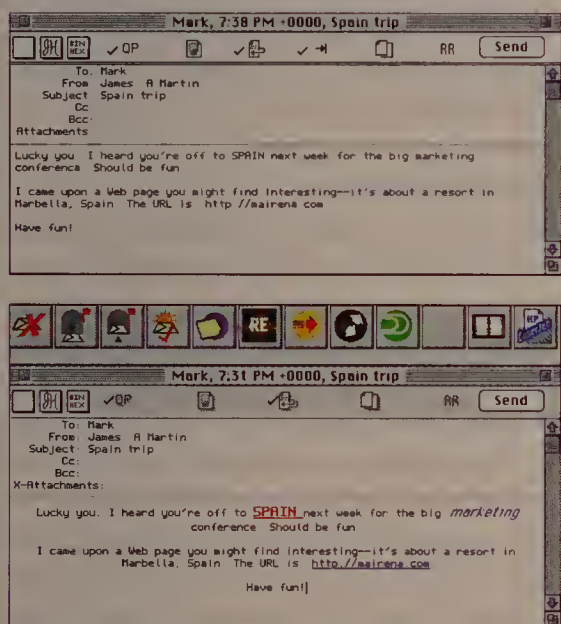


Of course, getting from here to there on your Mac requires more than software—at a minimum you need a reliable 28.8-Kbps modem to connect you to the outside world. Increasingly, though, many telecommuters are looking toward ISDN technology as a way to get where they're going—at speeds up to 115 Kbps, about four times faster than what a 28.8 modem can deliver.

With ISDN, you can videoconference from home (though it's still slow; see "The Video Connection," May 1996); transfer large files to and from the company LAN with a minimum of pain; cut the time for graphics-intensive Web pages to load; and use one ISDN line to send data from your Mac while you talk on the telephone or receive a fax.

Yet, tell a colleague you're installing an ISDN line at home and watch the reaction. The eyes widen, the mouth drops, and inevitably a hand will reach out to offer a comforting pat on your shoulder. Between the intimidating array of buzzwords (SPID numbers; B1, B2, and D channels; and such) and the numerous protocols that make it anyone's guess if an ISDN terminal adapter will actually work with a particular ISDN switch, it's no wonder that some wags say ISDN stands for "I Still Do Not Understand."

**Installation Anxiety** The ISDN installation at my home turned out to be something of a harrowing experience. A Pacific Bell technician installed my line within three hours and left me a small peel-off sticker, on which he said he had



**Eudora Before and After** Sending E-mail in Eudora Pro 2.1.2 (top) is a pretty dull affair, compared with the colorful tool bar and text-styling capabilities of Eudora Pro 3.0 (bottom). You can even embed active URL links in the latest version.

those calls for me. I launch the program, make coffee, and by the time I'm done, EMailer has logged on to AOL, CompuServe, and my ISP account and placed all new messages into one in-box. I still have to log on to the Macworld QuickMail server, however, as EMailer isn't compatible with LAN-based mail servers.

Claris EMailer 1.1, due to ship by the



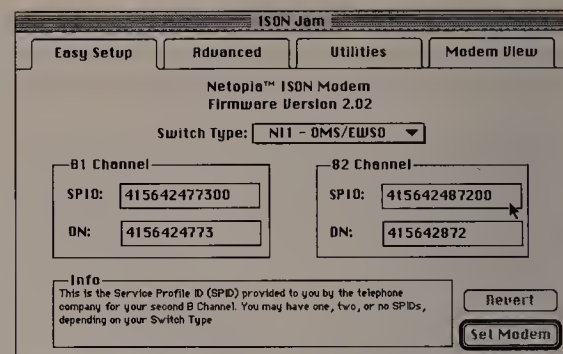
written everything I'd need to configure my ISDN terminal adapter (I used Farallon Computing's Netopia [510/814-5100, <http://www.farallon.com>]; company's estimated price, \$329). But later, when I typed in the information on the sticker, the Netopia's setup window on my Mac informed me that "the settings . . . do not match the current modem settings." I called Pac Bell's ISDN support line and learned that I needed to add two zeros at the end of each number.

The zeros worked. But that was just the first step, and from there it was another six hours before I finally made my first ISDN connection. In between, I made calls to Farallon, Apple, PSI (the ISP I was trying to use to get onto the Internet), and again to Pacific Bell, to try to resolve cryptic Apple system messages ("There was a problem with the modem . . ."), ensure that the D channel was indeed synced to the ISDN switch, determine whether the much-maligned Open Transport was the culprit, and so on.

I never did receive a clear, consistent

explanation as to what had prevented me from connecting; my guess is that it was several small things that could only be discovered through the process of elimination. An example of how easily you can get tripped up: A Pac Bell representative told me that to operate a B channel at 64 Kbps, I should include a 1 and the area code for that channel's SPID number—even though it was a phone number within my area code. When operating that channel at 56 Kbps, however, the instructions were to configure the line *without* the 1 and area code.

**ISDN: Summing Up** Once connected to ISDN, I saw a marked improvement in how Web pages drew on screen—but I also experienced a lot of mysterious disconnects. As a result, I don't recommend getting ISDN unless you truly, madly, deeply need it—for instance, for regularly sending and receiving large files (such as graphics and multimedia). Other conditions: you don't mind the extra expense (while costs vary around the country, you can expect to pay about \$25 a month for



**ISDN Installation** Whenever you put the cursor on an entry in Farallon Computing's Netopia installation-software setup window, the program explains to you what that entry is (in this case, SPID numbers are explained in the box, bottom left). Still, there's a lot to setting up an ISDN line that it doesn't tell you.

basic service, a usage charge of 1 to 3 cents per minute during the week, hefty installation fees, and higher ISP monthly rates for ISDN connections), and you're either a network guru yourself or you can talk your company into lending you one for the setup.

There's hope on the horizon, though, as more companies step in to provide soup-to-nuts ISDN assistance. Farallon's new Up & Running, Guaranteed ISDN setup service (\$99), for instance, promises to take care of the installation hassles for you (it wasn't available during my evaluation).

## The Last Word

While there are lots of sophisticated tools available for telecommuters, the best strategy is to start with the basics. Begin with ARA for simple remote connections, or Eudora Pro for E-mail from an Internet access account.

Once you're comfortable with remote access, you can equip your Mac to help you accomplish just about anything you'd normally do in the office, from dragging and dropping files between hard drives (via Timbuktu Pro for Networks), to meeting with colleagues face-to-face (via videoconferencing). Therein lies the beauty of telecommuting: the ability to virtually "be" in the office, even when you're thousands of miles away. And who knows? Without those interruptions, meetings, and other office hassles, you might become so productive you'll be able to squeeze in that extra game of golf after all. **m**

Former *Macworld* editor JAMES A. MARTIN telecommutes to the *Macworld* offices from his home in San Francisco.

## TELECOMMUTING SOFTWARE CONNECTIONS

### E-mail over the Internet

#### Editors' Choice

**Claris E-mailer 1.03 ★★★★★/8.6** Company: Claris (408/987-7000, <http://www.claris.com>). **Company's estimated price:** \$49. Have more than one E-mail address? Then you need E-mailer, the only application that dumps (almost) all your messages in one in-box.

**Eudora Pro 2.1.2 ★★★★★/6.6** Company: Qualcomm (619/587-1121, <http://www.qualcomm.com>). **List price:** \$89. Eudora Pro is a fast and reliable package, with good message-handling features. The program's address-book features are virtually nonexistent, however.

### Company-Wide E-Mail

**cc:Mail Mobile for Macintosh 2.0 ★★★★★/5.5** Company: Lotus Development (617/577-8500, <http://www.lotus.com>). **List price:** Single user \$145; each additional user \$55. Speedy and straightforward, cc:Mail is a good choice for those in PC-centric environments. But it lacks many of the important mail-handling, tracking, and other features its competitors offer.

#### Editors' Choice

**FirstClass 3.11 ★★★★★/8.1** Company: SoftArc (905/415-7000, <http://www.softarc.com>). **List price:** 5 users \$495; 10 users \$695; 25 users \$1495. FirstClass offers robust E-mail, conferencing, and other features that reach into the workgroup application realm, yet this product is as easy to use as a simple E-mail program.

**QuickMail 3.6 ★★★★★/6.3** Company: CE Software (515/221-1801, <http://www.cesoft.com>). **List price:** Single user \$199; 10 users \$649; 25 users \$1449. This entrenched client-server E-mail program is easy to use, but sending messages requires several steps, and message tracking features are limited.

### Remote Access/Remote Control

**Timbuktu Pro 2.0 for Networks ★★★★★/5.5** Company: Farallon Computing (510/814-5000, <http://www.farallon.com>). **Company's estimated price:** Single user \$139; 2 users \$189; 100 users \$3999. Despite some drawbacks, Timbuktu Pro's remote-access, remote-control, desktop-conferencing, and tech-support features make it the next best thing to being there.



# Best Buys in Optical Drives



MACWORLD LAB TESTS THE TOP STORAGE OPTIONS  
FOR CONTENT CREATORS WITH MEGS TO MOVE

**T**hese days of runaway file-size inflation make most of us lust after infinite storage with ultimate reliability. Just ask anyone who regularly works with digital video or massive Adobe Photoshop projects, or needs to archive or transfer gigabyte-size files. If that includes you, you should consider the current crop of large optical drives. Optical drives offer the maximum amount of storage available in a random-access removable medium. Our tests and cost evaluations indicate, however, that smaller-capacity optical drives may not make financial sense.

In order to help you select the best drive for your application, we tested 13 drives with 5 different capacities to find the best performers. As a baseline for evaluating the primary capacities available today, we tested two older technologies—a representative 3.5-inch magneto-optical (MO) 230MB drive (FWB's HammerDisk 230), and a 5.25-inch 1.5GB Phase Change drive from Panasonic (<http://www.panasonic.com>), the LF-7300A (it uses only lasers to read and write data, unlike magneto-optical technology, which combines a laser with a magnet).

We tested six 5.25-inch, 2.6GB MO drives (today's primary optical standard); a 3.5-inch 640MB MO drive; and four of the new PD (Phase Change Dual, which uses MO technology, despite the name) drives that store 600MB on a removable platter and double as 4× CD-ROM drives. We also assessed the relationships



ROBERT PERRY

between cost, capacity, and performance in all these categories.

## Defining Your Needs

To decide which type of optical drive to buy, or even if optical is the right choice for you, first evaluate what you intend to use the drive for. How large are the files you're going to be storing? What is the minimum-size medium they will fit on? If you're saving digital-video files, you may need gigabyte-size storage, whereas Photoshop files may fit on a 230MB MO disc.

Do you plan to share data with lots of colleagues or service bureaus? MO drives offer the advantage of cross-compatibility; they read and write MO media written in other drives. For example, the 2.6GB MO drives can read and write to older 1.3GB media and read 650MB media from first-generation 5.25-inch MO drives. MO and PD drives are not compatible, however.

You should also consider that optical drives are slow. Don't plan on working directly with data stored on them if you value your time. A SyQuest product or



Jaz drive from Iomega may be your best bet if you need to work directly from a cartridge, rather than on a large fixed hard drive.

Media costs add up very quickly, and you may find that the initial cost of a drive with larger capacity is easily balanced against the stack of discs you'll need with a smaller drive. While the larger-capacity cartridges initially cost more per megabyte, once you cross the 1GB threshold, 2.6GB cartridges offer a clear cost advantage.

But can you afford a 2.6GB MO drive, even if your storage needs require it? If your budget is small, consider a digital-audiotape (DAT) drive as offline backup for your hard drive rather than using removable media. You also could combine a DAT drive with DeskTape from Optima Technology (<http://www.optimatech.com>) and get acceptable performance—faster than a floppy, anyway, for a relatively fast tape drive. DeskTape lets you treat a tape drive like a hard drive, with random access to files.

And if you don't already own a CD-ROM drive, a PD drive may make sense. Although its performance is at the bottom of the pack, its combination of moderate storage capacity with a CD player makes more sense than paying about the same price for a 230MB MO drive.

All of the drives we tested come with a one-year warranty, except the PowerMO 2600 from Olympus Image Systems (<http://www.olympus.com>), which includes a two-year warranty; so once you've determined the capacity you need, speed and pricing emerge as the primary buying considerations.

### Size Determines Speed

The drives we tested use mechanisms manufactured by just a few companies. So within each capacity, we found close competition in our performance testing (see the benchmark, "Laser Speeds").

The best performances were turned in by 2.6GB drives: La Cie's (<http://www.lacie.com>) \$1999 2.6GB Optical and Optima's \$2395 DiskOvery 2600MO.

Each used a similar Sony mechanism and provided its own formatting utilities. Plasmon Data's (<http://www.plasmon.com>) \$2575 Cheetah Plus drive uses the same Sony mechanism as Optima's product, but Plasmon's formatting utility delivered 30 percent slower performance.

The Panasonic 1.5GB Phase Change drive had poor performance for its size. It uses an older mechanism that hasn't caught on well in the Mac market; its PC-oriented documentation reflected this.

The PD drives offer an intriguing mix of features. While the performance of the PD portion of the drive won't set any records, it doesn't need to for the target customer. The combination of a CD-ROM reader with a rewritable-media option may make sense for someone with modest optical storage needs who hasn't already bought a CD-ROM drive or who is upgrading from a slower model. All of the PD drives we tested used similar mechanisms from Matsushita (Panasonic's parent company).

While Panasonic's PD/CD-ROM



## Laser Speeds

For top performance in an optical drive, the formatting software and verification settings each play a key role, as the stark contrast between the Optima and Plasmon units shows; they use identical mechanisms but different formatters, and the Plasmon Cheetah Plus ships with

verification on, the setting that improves data security. Depending on the driver software, the user can select verification off for a performance improvement. In general, the 2.6GB units left those with other capacities far behind.

Best result in test. Shorter bars are better. Times are in seconds. Products are listed in decreasing order of overall performance.

Drive (Mechanism/Formatter)	Overall Performance Ranking*	4D Search	Open Photoshop File	Save Photoshop File	Copy to Drive	Copy from Drive	Duplicate 40MB File
La Cie 2.6GB Optical (S1/L)	1.00	357	137	90	32	39	52
Optima DiskOvery 2600MO (S2/O)	0.99	366	92	78	58	35	64
Olympus PowerMO 2600 (O/F)	0.71	366	147	108	62	66	106
Plasmon Cheetah Plus (S2/F)	0.69	398	148	105	67	67	106
La Cie 640MB MO Optical (F1/L)	0.67	525	195	121	103	38	89
Maxoptix T4-2600 (M/H)	0.60	423	191	132	86	60	130
HP SureStore Optical 2600FX (H/F)	0.56	471	257	158	69	70	111
Panasonic PD/CD-ROM (MA1/C)	0.49	671	198	159	94	63	170
Plasmon PD/CD (MA2/C)	0.45	664	234	210	103	64	171
Panasonic LF-7300A (MA3/C)	0.43	744	328	175	100	73	147
Toray Phasewriter Dual PD (MA1/P)	0.42	709	220	165	142	74	247
FWB HammerDisk 230 (F2/H)	0.41	577	255	240	165	72	212
APS PD4 (MA2/A)	0.39	909	303	260	97	68	180

\*Compared with the fastest drive (which has a ranking of 1.00).

Mechanism Key: F1 = Fujitsu M2513A 0800; F2 = Fujitsu M2512A; H = Hewlett-Packard C113f 1.26; M = Maxoptix T4-2600 B000; MA1 = Matsushita PD-1 LF-1000A109; MA2 = Matsushita PD-1 LF-1000A108; MA3 = Matsushita LF-7300AA114; O = Olympus MOS540 1.01; S1 = Sony SMO-F541+3; S2 = Sony SMO-F541 1.09.

Formatter Key: A = APS PowerTools 4.0.4; C = CorelSCSI for PD 1.0.2; F = FormatterOne Pro 1.4; H = HDT Primer PE 1.7.6s; L = La Cie Storage Utilities 1.3; O = Optima DiskMount 2.8; P = PD Pack for Macintosh 1.0.

### Behind Our Tests

Macworld Lab tested optical drives using our standard suite of business and graphics applications. To show the effects of fast access, we ran an unindexed search of a 96,775-record ACI US 4th Dimension Database. For an indication of data throughput, we opened and

saved a 40MB file in Adobe Photoshop. To determine general performance, we duplicated a 40MB file in the Finder, as well as copied the file to and from our internal drive.—Macworld Lab testing supervised by Matt Clark and Chris Uiterwijk



## A Clear View of Optical Drives

Company	Product	Star Rating *	List Price/Company's Estimated Price **	Phone	Drive Capacity/Type
<b>Editors' Choice</b>					
APS Technologies	APS PD4	★★★★/7.2	\$499.95/\$499.95	816/483-1600	600MB/PD
FWB	HammerDisk 230	★★★/5.4	\$769/NP	415/325-4392	230MB/MO
Hewlett-Packard	HP SureStore Optical 2600FX	★★★/5.0	\$2995/NP	970/635-1000	2.6GB/MO
La Cie	640MB MO Optical	★★★/6.2	\$599/NP	503/520-9000	640MB/MO
<b>Editors' Choice</b>					
	2.6GB Optical	★★★★/7.6	\$1999/NP	503/520-9000	2.6GB/MO
Maxoptix	T4-2600	★★★/5.8	\$2425/\$2200	510/353-9700	2.6GB/MO
Olympus Image Systems	PowerMO 2600	★★★/6.8	NP/\$2199	516/844-5000	2.6GB/MO
Optima Technology	DisKovery 2600MO	★★★★/7.4	\$2395/\$2375	714/476-0515	2.6GB/MO
Panasonic Communications & Systems	LF-7300A	★★/4.9	\$2995/\$2695	201/348-7000	1.5GB/Phase Change
	PD/CD-ROM	★★★/5.2	\$649.95/NP	201/348-7000	600MB/PD
Plasmon Data	Cheetah Plus	★★★/5.9	\$2575/\$2525	408/474-0100	2.6GB/MO
	PD/CD	★★★/6.9	\$620/\$570	408/474-0100	600MB/PD
Toray Marketing & Sales	Phasewriter Dual PD	★★★/6.4	\$749.95/\$649	415/341-7152	600MB/PD

NP = Not provided by vendor. \* Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) \*\* Actual prices could be higher or lower than the estimated street price provided by the company.

drive turned in the best performance numbers for these combination units, this superiority didn't quite make up for nonstandard, high-density SCSI connectors, DIP switches for SCSI ID selection, and a poorly written manual. In contrast, while APS Technologies' (<http://www.apstech.com>) version was the slowest we tested—about 20 percent slower overall than the Panasonic—it boasts a small footprint; excellent software (including both formatting software for the PD drive and CD caching software for the CD-ROM); and the expected amenities, such as a manual that makes sense, an aesthetically pleasing case, and easy-to-set SCSI selectors.

The Fujitsu-based 640MB MO Optical from La Cie turned in relatively good performance numbers. But the drive is priced the same as a 1GB Jaz drive from Iomega (801/778-1000, <http://www.iomega.com>), and offers only 64 percent of the storage space and much slower performance. Its media costs compete well against the Jaz drive's (\$50 versus \$119), but balance that against the fact that La Cie seems to be the only company selling this drive, which, like the Panasonic PD/CD-ROM unit, suffers from nonstandard SCSI connectors.

FWB's (<http://www.fwb.com>) \$769 HammerDisk 230 is vastly overpriced for both its storage capacity and its lackluster performance. The only perceivable benefit of such a drive is its compatibility

with the large 230MB MO installed base. While other vendors offer 230MB drives at a lower cost, they are priced similarly to the current crop of PD drives—not a good deal for less storage and less flexibility.

### The Last Word

Today's MO drives require a two-stage process to write to a disk: an erase pass and a write pass (there is also a verify pass that you can turn off in some drives).

Around the time you read this, however, a new generation of 2.6GB MO drives should be hitting the market. Based on a new direct overwrite technology, these drives should offer significantly better write performance. That performance gain will occur only with new media, although all of these new drives will still read and write to older 2.6GB MO media. None of these new drives were available in time to test, though a handful of manufacturers opted not to submit their current drives for testing, citing the imminent release of these new drives.

Optical drives are experiencing tough competition these days from other media as well. On the low end, Zip and Syquest EZ135 drives offer only half the capacity—but at less than half the cost and more than twice the performance. On the high end, Jaz drives attract those who need performance over capacity.

Still, the new direct-overwrite 2.6GB

drives will improve optical's performance— inching a bit closer to hard-drive speeds. And on the cost/capacity curve, the more data you have, the more sense optical drives make. For truly massive portable data needs, optical is still king. **m**

MATTHEW LEEDS is technical services manager for a major software developer.

### OPTICAL DRIVES



For optical drives, we looked for the best mix of price/performance, clear documentation, useful bundled software, and good overall design.

#### 2.6GB Optical Drive

★★★★/7.6 2.6GB Optical Excellent performance in its class, very good software, a well-designed case, and aggressive pricing make this the top pick. **Company:** La Cie (816/483-1600, <http://www.lacie.com>). **List price:** \$1999.

#### PD/CD Drive

★★★★/7.2 APS PD4 This PD/CD drive boasts excellent utility software, a well-designed case, and a very affordable price. It takes the prize despite being slower than the competition; in this hybrid category speed is secondary to these other features. **Company:** APS Technologies (816/483-1600, <http://www.apstech.com>). **List price:** \$499.95.



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*messaging*  
SYSTEM,  
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# Secrets

## The Hidden World of FileMaker Pro

DATA-CRUNCHING SECRETS FOR FILEMAKER FANS

by Joseph Schorr

**F**ileMaker Pro 3.0 is far and away the most popular database program on the Mac—and it also happens to be packed with secret features and deeply buried shortcuts that are so powerful and so practical it's almost morally wrong *not* to use them. If you think you're getting a lot out of FileMaker now, wait until you try crunching data with the help of these little-known tips for the true FileMaker pro.

### Laying Out Your Options

When you're designing a new FileMaker layout, choosing Select All (⌘-A) normally selects every object on the layout. But suppose you want to select only certain items—say, all text labels—to reformat them. The secret is to click first on the tool that corresponds to the type of object you want to grab and *then* choose Select All. To change the font of all field labels, click on the text tool before pressing ⌘-A. Now FileMaker will select just the text items. This technique works with portals, lines, shapes, and text objects.

One of the best formatting shortcuts is new to version 3.0. In Layout mode, hold down the control key as you click on any object, and a menu containing all the vital formatting commands pops up right under your mouse (see "Secret Menus"). Even better, option-double-click on any object to go directly to the appropriate formatting dialog box.



Once you've formatted an object, option-drag it to create more objects with exactly the same attributes. This is especially helpful for fields, which have lots of attributes to set. Once you have a field with the text, size, fill, and border attributes you want, just option-drag it, and FileMaker automatically opens the Specify Field dialog box, where you choose which field you want to add. The newly added field will have the same specifications as the one you dragged.

Try this tip once and you'll be hooked: normally, to select by dragging

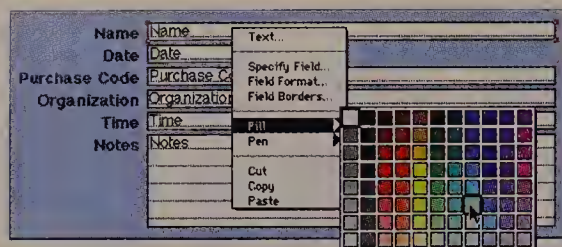
on a FileMaker layout, you must completely enclose the object you want in the selection rectangle. But holding down the ⌘ key and dragging over just part of an object selects it. This is a much faster and easier way to select groups of objects, especially in complex layouts.

### The Great Escape

The lowly escape key doesn't do much in most Mac programs, but in FileMaker Pro it provides an express route to a variety of functions.

*continues*





**Secret Menus** Holding down the control key when you click on an object puts the appropriate menu—such as this pop-up menu of fill colors—right under your pointer.

When you tab into a field that displays a pop-up list of values, you can hide the list by pressing escape. This is especially useful if you want to type your own value into such a field; escape lets you jump right into typing mode without clicking on the field to dismiss the pop-up. If you find you *do* need to choose an entry from the list after it's gone, pressing escape again pops it right back up.

The escape key also provides a fast way to find a particular record or layout

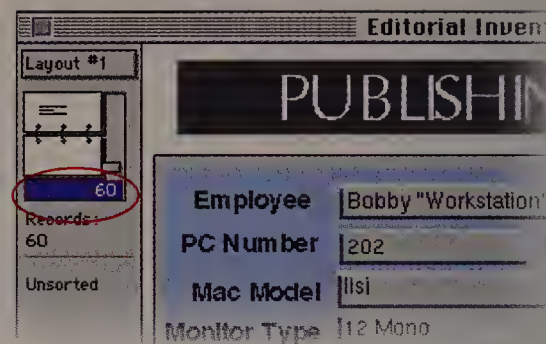
(see "Navigate by Number").

In the Define Fields dialog box, you can press escape to activate the Done button, close the dialog box, and return to your database after editing field definitions.

Of course, escape can also activate the Cancel button in all standard dialog boxes. (Many programs support this feature.) True, you can also do this by pressing ⌘-period (.), but using escape takes just one hand and one key—not two.

### Power Copying

FileMaker enthusiasts probably already know one of its best secrets: you can copy and paste the contents of an entire record simply by choosing Copy (⌘-C) with the record selected. When you paste what you've copied into another program, you get a tab-delimited chunk of text containing all of the data displayed in the current layout for that particular record. It's an easy way to transfer the contents of an entire record without using the Export



**Navigate by Number** The escape key in FileMaker has many practical functions. One lets you select a record by number—the quickest way to pull up a FileMaker record. Press escape to highlight the current record number in the status area, type the number of the record you want, and press return to jump to that record. (This works only if your cursor isn't in an active field when you press escape.) Use the same technique to switch layouts in layout mode.

command or copying information one field at a time.

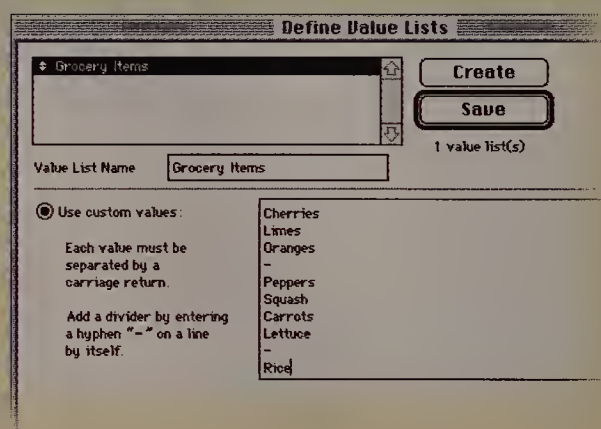
But even old hands may not know that you can extract information from *several* records—not just the one you're viewing. The secret is to hold down the option key while choosing Copy (or press ⌘-option-C). This copies the data from *all* the currently selected records. Just paste what you've copied into a word processor to get a tab-delimited text version of your entire database (or a subset of it). Paste the copied data into Microsoft Excel, and your FileMaker database instantly transforms into a spreadsheet.

## Lines of Separation

Most seasoned FileMaker users know how to set up value lists, which present database users with a list of choices in the form of a pop-up menu, a scrolling pop-up list, or a series of check boxes or radio buttons. But there's a frequently overlooked way to make those value lists look even better. The following trick was hidden in 2.1 but appears in plain view in 3.0.

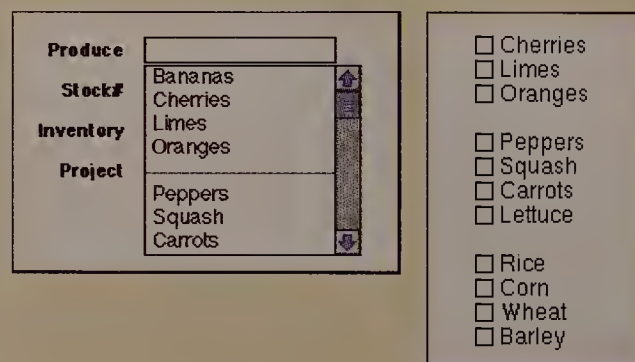
**1** Define a field that includes a value list. Set up a new field in the Define Fields dialog box and click on the Options button. Then switch the pop-up menu to Validation in the Entry Options dialog box, activate the Member of Value List check box, and choose Define Value Lists from the pop-up menu.

**2** When you are defining a list in the Define Value Lists dialog box, add a single hyphen on its own line between groups of values.



**3** The hyphen translates into a separator line in pop-up menus and pop-up lists (near right). The same definition adds spaces between clusters of radio buttons and check boxes (far right).

This same technique applies to the Scripts menu. In the Define Scripts dialog box, creating an empty script with the hyphen symbol (-) as its name creates a separator line that you can place between scripts to divide them into logical groups.

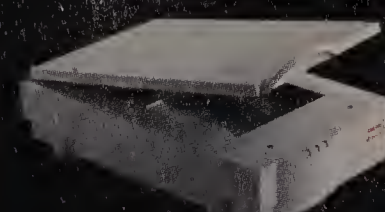


### World's Fastest Imports

New to version 3.0 is a way to turn a tab-delimited text file—or any other file in a format that FileMaker can understand—into a new FileMaker database without defining any fields and without importing the data into an existing file. Launch FileMaker and choose Open. Then open a file that's in any format FileMaker supports for import: tab- or comma-delimited text, SYLK, DIF, ClarisWorks, and so on. When you open the file, FileMaker automatically creates a new database, imports all the records, and defines a new field to hold each piece of data. The new fields will be named f1, f2, f3, and so on. Sure, you'll still have to format the fields, and you'll probably want to rename them. But with virtually no setup time, you've moved your data into FileMaker format, ready to sort and search. **m**

Contributing editor JOSEPH SCHORR is coauthor of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).





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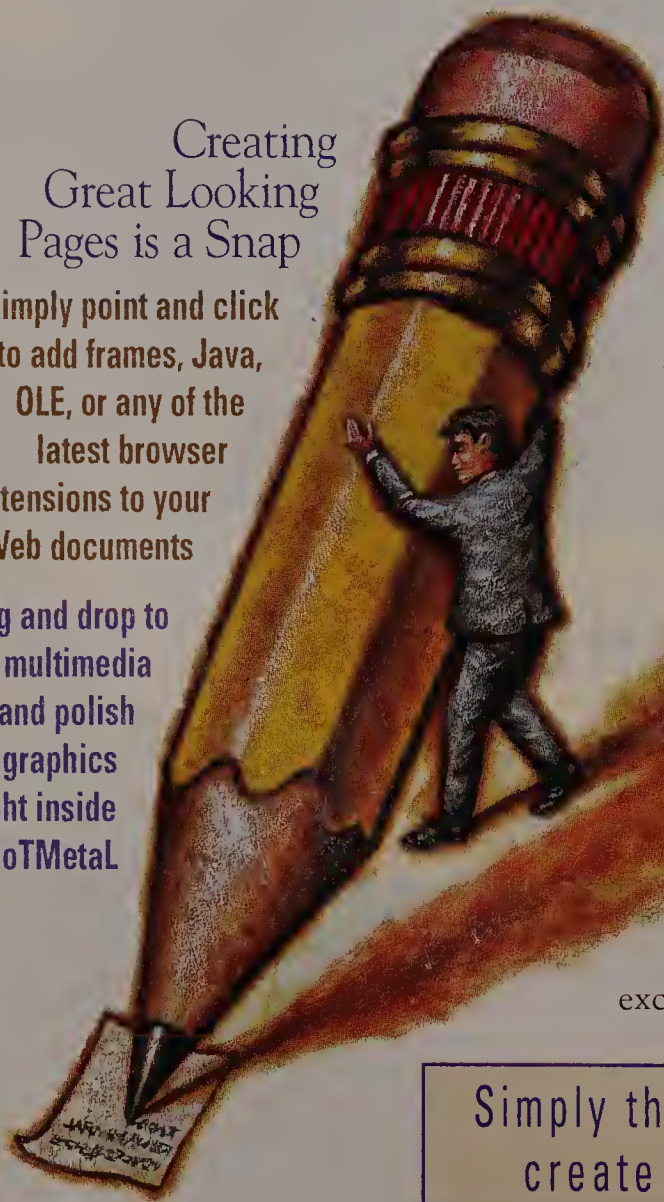
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Circle 28 on reader service card



## Tips, Tricks, and Shortcuts

by Lon Poole

Do you know how much time you've spent on the Internet this month? Fernando Viesca of Chelsea, Massachusetts, suggests you look at PPPremier Timer, a smart piece of freeware by Nathan Lamont. Not only does it display alternately the duration of your current PPP connection and your total time online (optionally resetting the total each month), but you can use it to open or close a PPP connection with the click of a button. PPPremier also times connections you open and close with the Config PPP or FreePPP control panels; connections you open with AppleScript programs (as described in "Automating Internet E-Mail," below); and connections automatically opened by Internet applications such as Netscape Navigator (assuming you have enabled Automatic Connection in the Config PPP or FreePPP control panel). The latest PPPremier is available at <http://www.tiac.net/users/bigplan>.

### Upgrading 630-Series Memory

**Q** I'm always seeing ads for memory upgrades. If I order RAM for my Performer 638, how do I get it installed? Can I do it? Do I take it to an Apple dealer?

PAM WENGER  
Dillsburg, Pennsylvania

**A** It's pretty easy to install a RAM SIMM or other expansion card in a 630-series model. You access the expansion slots, including the single SIMM slot, by popping off a plastic panel, removing two screws on the back of the case, and sliding out the motherboard. The 630-

series SIMM slot accommodates a 1MB, 2MB, 4MB, 8MB, 16MB, or 32MB SIMM rated 80 nanoseconds or faster.

As you shop for a memory upgrade, look for a lifetime warranty from a company that, as best you can tell, will be around to honor the warranty. RAM chips are very reliable, but I have had them fail more than a year after installation. Buy from a company that includes illustrated installation instructions for your make and model. A grounding wrist strap is a good precaution against damage due to static electricity discharge during installa-



tion (though this is unlikely to happen). If the SIMM seller doesn't include one, you can buy it from an electronics store (Radio Shack part 276-2397; \$3.99).

If you don't want to upgrade the memory yourself, take your computer and SIMM to an Apple dealer or other computer service center. A technician should be able to install the SIMM in well under 30 minutes, so you shouldn't have to pay for more than a half hour of labor. Some stores charge less to install memory they sell you, so investigate before buying.

### ResEdit Source

**Q** Where can I download a copy of ResEdit?

CODY DOERFLER  
Black Hawk, Colorado

**A** ResEdit is available from Apple's <http://www.info.apple.com> Web page, Apple's FTP sites such as <ftp://ftp.info.apple.com/Apple.Support.Area/> (the directory path is Apple.Software.Updates.US:Macintosh:Utilities) and <ftp://ftp.support.apple.com>, and Apple's AOL site (keyword *AppleComputer*).

For ResEdit and a bunch of extras, get a copy of the book (with CD) *Zen and the Art of Resource Editing*, fourth edition (Hayden Books, 1995; \$30), by Derrick Schneider and Hans Hansen. The book shows how to customize your Mac, initiates newcomers to the realm of resources, and makes a handy reference for the experienced hacker.

### Automating Internet E-Mail

**Q** I read in "Office Essentials" (June 1996) that Claris EMailer "dials in to each account, retrieves any waiting mail, sends

the messages you have waiting to go out, and logs off." In my experience, EMailer does all this except log off after mail transmission. The connection must be disconnected manually.

Might this be because I am using EMailer Lite? Or because I am dialing in with Apple's MacPPP, which came with the Internet Connection Kit? Or is there a secret I haven't figured out?

M. PENNER  
New York, New York

*continues*



**A** E-mailer sends and receives E-mail, but like other Internet applications it relies on software such as MacPPP or its cousin FreePPP to open and close Internet connections. You can automate your Internet E-mail by scheduling E-mailer or E-mailer Lite versions 1.0.2 and later to execute an AppleScript program that dials through MacPPP or FreePPP, accesses your mail through E-mailer or E-mailer Lite, and hangs up through MacPPP or FreePPP. E-mailer 1.0.2 and later come with an AppleScript program and instructions; E-mailer Lite does not. Unfortunately,

the AppleScript program isn't reliable unless you bring E-mailer or the AppleScript program to the front while PPP is making a connection.

An improved set of AppleScript programs, called Internet MacPPP 1.1.2, is available on the Fog City Web page, <http://www.fogcity.com/Utilities.html>. The site has MacPPP Control, an AppleScript addition file that enables AppleScript to open and close an Internet connection through MacPPP or FreePPP; neither E-mailer Lite nor the full E-mailer includes this essential item. Get MacPPP Control

version 1.5 or later if you use MacPPP or FreePPP version 2.5 or later.

Put the AppleScript programs in the AppleScripts folder that is inside the Claris E-mailer Files folder. Put MacPPP Control in the Scripting Additions folder, which is inside the Extensions folder.

To schedule your Internet mail connection and disconnection, open E-mailer or E-mailer Lite and choose Schedules from the Setup menu. In the Schedule Entry dialog box, choose AppleScript from the Execute pop-up menu and choose Internet MacPPP 1.1.1 (Hard) from the AppleScript pop-up menu, as shown in "Scheduled Internet Mail Call." (If you use the AppleScript programs that come with the full E-mailer, choose Internet Using MacPPP from the AppleScript pop-up.) Enter an appropriate schedule name and set the schedule times as documented in the E-mailer manual. Don't forget, E-mailer makes scheduled connections only when it is open.

Instead of scheduling an AppleScript program, you could also set a short Idle Timeout interval in the Config PPP control panel (labeled the Disconnect If Idle For interval in the FreePPP control panel), but this can be unreliable. For example, a Web browser might open to a Web page that is not idle long enough to trigger a disconnection.

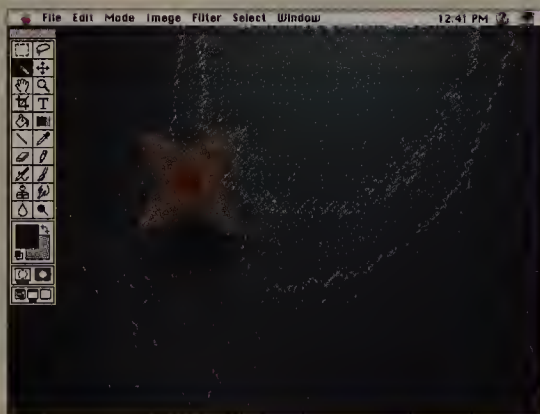
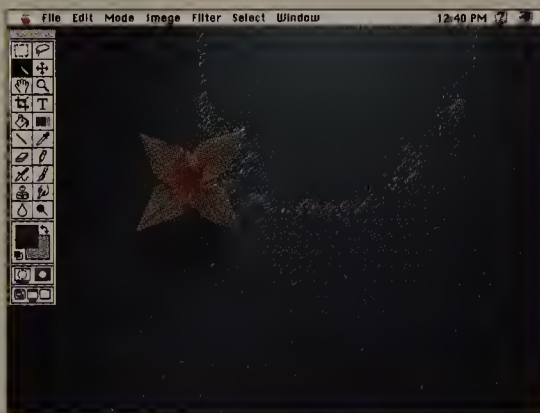
## Selecting a Gradient Background

Although Adobe Photoshop isn't really set up for selecting a gradient background, Luc Desaulniers of Montreal, Canada, has come up with a technique that works with images in which the colors in foreground objects are completely different from the background colors you are selecting. Follow these steps.

1. Use the magic-wand tool to select the area where the background tint is lightest.
2. Hold down the shift key while using the magic wand to select the area where the background tint is darkest.
3. Choose Similar from the Select menu and save the selection.

This technique is appropriate for medium-quality images, particularly images with hard-edged transitions between foreground objects and the background, but it probably wouldn't produce satisfactory results in a fine-arts image in which you have carefully woven the foreground objects into the background using antialiasing. The magic-wand tool does have antialiasing, but it may produce a chunky effect at the selection's edges, possibly causing the selection to come into the foreground object.

The magic-wand tool and the Similar command both use the magic wand's tolerance setting. The magic wand's default setting, 32, should work for most light-to-dark gradients, but probably will not work for a multiple-color gradient.



## Desktop Icons Get Small and Disappear

**TIP** You can't use the Finder's View menu to change icon size on the desktop, but you can make individual icons small using ResEdit as follows.

1. Make an alias of the item that you want to have a small icon.
2. Open the original item with ResEdit, open the ics8 resources, and open the ics8 resource for the small icon. (If you're opening a compressed icon and ResEdit asks if you want to go ahead, say yes. It's OK; you're not making permanent changes.)
3. Choose Select All and then Copy from the Edit menu to put a copy of the small icon on the Clipboard.
4. Open the icl8 resources and choose Create Resource from the Resources menu, opening an icon-editing window for a new icon resource.
5. Select the icl8 box in the icon-editing window, and paste the icon into it.
6. With the pasted icon still selected,



move it to the bottom of the icon-editing area (drag the icon or press the down-arrow key). This step reduces the gap between the small icon and its name on the desktop.

7. Choose Select All and then Copy from the Edit menu to put a copy of the lowered small icon on the Clipboard.

8. Close all ResEdit windows. When ResEdit asks if you want to save changes, answer no. You do not want to save them.

9. Switch to the Finder, select the alias, and use Get Info to bring up the alias's Info window. Click the icon in the Info window and use the Paste command to replace it with the small icon you copied to the Clipboard. Close the Info window and give the alias a short name.

Repeat the process, and you will have a compact alternative to the Launcher.

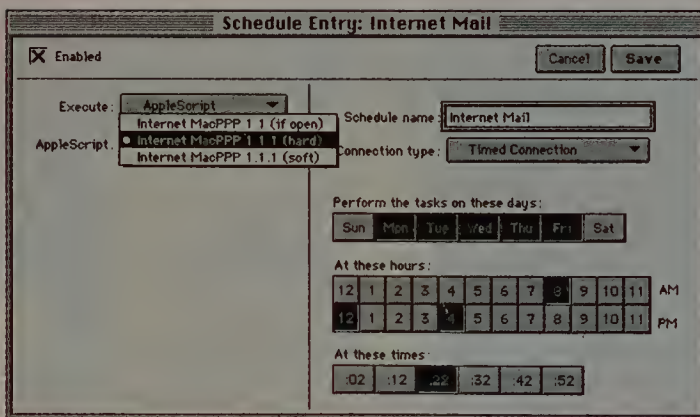
WYATT HADLEY  
Rowan, Iowa

*An alternate method doesn't require ResEdit, but it usually leaves a gap between an item's small desktop icon and its name. To make a small icon, put the item in a window (not on the desktop) and use the Finder's View menu to view the window by small icon. Take a snapshot (by pressing  $\mathbb{H}$ -shift-3) and double-click on the snapshot document to open it in SimpleText. Select the small icon in the snapshot (don't worry if you select some surrounding white space) and copy the selection to the Clipboard. Switch to the Finder and paste the copied small icon into the alias's Info window. (If the copied icon includes surrounding white space, the Finder automatically crops it away.)*

*An oldie but a goodie: to eliminate an item's desktop icon, take a screen snapshot that includes some white space, open the snapshot with SimpleText, select any amount of white space, and copy the selected white space. In the Finder, paste the copied white space into the Info window of any icon. The Finder eliminates all the white space, leaving no icon. All the item has on the desktop is its name.—L.P.*

## Stylus Cushion

**TIP** If you use a Wacom or other pressure-sensitive stylus for long periods, try using one of the soft foam sleeves sold in office supply stores for pens and pencils. Not only does the sleeve



**Scheduled Internet Mail Call** Using Claris EMailer or EMailer Lite, you can fully automate checking your Internet mail, including opening and closing a dial-up Internet connection.

cushion your grip, it seems to make the stylus button easier to control. If the sleeve prevents the stylus from fitting in its holder, put the stylus's other end in the holder instead.

TIM SPIVEY  
Tifton, Georgia

## Quick Bits

MacTCP Monitor helps you see how fast your Mac is moving data on the Internet (as mentioned in July's *Quick Tips*) but doesn't trace the route data takes over the Internet. If you're using Open Transport (not MacTCP), you can use Bryan Christianson's free WhatRoute utility to find the names of all the routers that data passes through from your Mac to the destination host, and the round-trip time. Get the latest WhatRoute at <http://crash.ihug.co.nz/~bryan/>. Another free utility, Traceroute 1.1 by Jim Browne, traces routes with MacTCP (not Open Transport) but requires Mac Slip 3.0 (not MacPPP or FreePPP) for PPP connections. Traceroute 1.1 is available from Macworld Online. **m**

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Macs, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

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## The Revolution Will Be Netcast

by Cameron Crotty

You've always been an early adopter, so a year ago when you heard companies start talking about streaming real-time audio and video over the

Internet, you knew it was hot. But recently you've been feeling more like a decked-out early arrival at a fancy party with lots of affirmative RSVPs but no actual guests. You've been religiously downloading client software updates and searching for something—anything—to watch or listen to.

Finally the relief is starting to trickle down your spine. No more nervously hanging out by the hors d'oeuvres, waiting for the other guests. Internet broadcasting, or *netcasting*, technology is starting to mature; the crowd is starting to show and mingle; and it looks as if a regulation, all-night rocker is in the making.

If you've ever grabbed a sound or QuickTime movie file off the Net, you may wonder why there's such a buzz around netcasting. The main difference is that when you're listening to or watching a netcast, the audio or video is coming to you in a real-time stream. That means no lengthy preplay downloads and no client-side storage problems (audio and video files are notoriously bulky).

Netcast quality still leaves much to be desired, as streaming audio and video playback is an infant technology, and playback over a 28.8-Kbps connection soon reveals the hard, cold reality imposed by bandwidth limitations.

But even with audio that sounds like an AM radio submerged in olive oil and video that's limited to a few tiny

.com/) keeps a library of albums for your listening pleasure. Want to get a custom news fix? Timecast (<http://www.timecast.com/>) lets you customize your own set of news, sports, and entertainment updates that you can listen to on your schedule. With netcasting, you can hear and see what you want, when you want.

broadcast news and commentary in April 1995, when Progressive Networks first announced RealAudio. They have since been joined by a slew of AM and FM stations nationwide, and the broadcasters have moved from pre-recorded clips to sending out live, real-time netcast streams. Netcasting stations span the spectrum from talk through college radio to commercial FM stations in large markets.

As I write this, I've been switching back and forth between KUSF-FM (<http://web.usfca.edu.kusf/>), a college station in San Francisco; KTBZ-FM, (<http://www.thebuzz.com/index.htm>), a modern-rock station out of Houston, Texas; and FM802 (<http://www.fm802.co.jp/>), a pop station out of Osaka, Japan. Talk-radio fans can tune in online as well, from local stations across the country to nationally syndicated shows like CompuTalk (<http://computalk.com/>), a technology talk show.

Some groups are beginning to netcast music events, ranging from full-on concerts to special performances (often sponsored by those plugged-in radio stations). MediaCast (<http://www.mediacast.com/>) has already netcast concerts by Joan Osborne and the Grateful Dead, and Apple's QuickTime Live series (<http://www.live.apple.com/>) has covered the opening of the movie



frames per second, netcasting's essentially worldwide reach and on-demand content offer experiences that aren't available anywhere else. Are you a Baltimore sports fan far from home? Just point your browser at <http://www.wbal.com> and listen to real-time broadcasts of Orioles baseball games. Want to listen to that new CD before you buy it? AudioNet (<http://www.audionet>

### Getting Live on the Net

It's no surprise that radio broadcasters are taking the point position on netcasting; video is too resource-intensive for most netcasters to bother with right now. National Public Radio (<http://www.npr.org/>) and the nationally syndicated ABC radio network (<http://www.abc.com/>) were the first into the breach, offering recorded portions of their



*Mission Impossible*, the Grammy Awards, and the 1996 Sundance Film Festival. At press time, the New York Music Festival was planning The Global Internet Gathering, a weeklong netcast of performances by 450-plus bands (<http://www.thegig.com/>). Many of these netcasters are also making available video feeds from their events, generally using White Pine's CU-SeeMe software (<http://www.wpine.com/>) or Xing Technologies' StreamWorks (<http://www.xingtech.com>).

### Fat Streams and Tiny Pipes

To judge from the number of companies and groups spend-

ing thousands of dollars on netcasting, you'd never guess that the technology provides roughly the same experience as listening to the Vienna Boys Choir gargling in a drainpipe as you flip through a photo album of grainy, postage-stamp-size images. Someday we may receive high-quality audio and video netcasts, but not until the industry has solved some of the knotty problems associated with sending fat media streams through the harsh environment of the Internet.

The current leading netcasting technology companies, including Progressive Networks (<http://www.realaudio>

[.com/](http://www.xingtech.com/)), Xing Technologies, White Pine, and VDOnet (<http://www.vdo.net>), all use similar techniques to get around the Net's limitations. The first obstacle is the tiny data pipes available to most users—generally well under 30 Kbps. Data must be compressed as much as possible: an uncompressed CD-quality audio stream chews up 125 Kbps, and uncompressed video demands even more, requiring data rates around a megabit per second.

Progressive Networks, VDOnet, and White Pine all have proprietary compression algorithms to squeeze their data, while Xing uses MPEG,

an industry-standard algorithm. All these methods are *lossy*, which means that the algorithm throws out some data, compressing data streams to the fine edge of comprehensibility. Losing even 5 percent of the transmitted packets seriously degrades quality, and a 15 percent dropout rate yields an essentially unusable stream.

Once the data stream is as tiny as possible, the server and client must deal with the vagaries of Internet packet delivery. Sending a document out over an IP network like the Internet is akin to cutting a letter up into scraps, putting each scrap in a separate pack-

## PREPARING TO SEE

Not only do you need a forgiving ear to enjoy netcasts, you also need a clear channel to the Internet, which means a direct SLIP/PPP connection through an ISP. Your connection needs to be fast as well; a 14.4-Kbps modem is

just barely quick enough to listen to the revolution. Then, once your hardware is in place, go grab the latest freeware client software. All the clients come as self-installing applications, and most automatically configure themselves after asking you what size network connection you have. Here are some tips for three of the most popular Netcasting clients: RealAudio, StreamWorks, and CU-SeeMe.

### RealAudio

The current young champion of the netcasting mediascape, Progressive Networks' RealAudio audio-only system is the most widely used and currently the most reliable system, especially under adverse Net conditions. Although the client runs as a stand-alone application, RealAudio 2.0 (the current client) is fairly browser-dependent, providing no local hot-listing capabilities. The most obvious workaround for this is to use your Web bookmarking tool to catalog your favorite audio sites.

You don't have to open your Web browser

whenever you want to listen to a RealAudio stream; you can take advantage of the fact that hitting a RealAudio Web link downloads a metafile, containing the server stream address, to your hard drive. You have to collect and organize these metafiles manually, but double-clicking on one launches the RealAudio player directly. Progressive Networks maintains a list of RealAudio streams, updated weekly.

### StreamWorks

The good news about Xing Technologies' netcasting client is that it can handle both audio and video, and the quality is generally higher than that of RealAudio and CU-SeeMe. The bad news is that StreamWorks is flakier than either competitor, repeatedly dropping connections even in moderate Internet traffic. The StreamWorks software is girded with an editable address book of streams servers. Connecting to a StreamWorks server reveals all the streams available on that server, organized hierarchically.

The StreamWorks client can handle both audio and video streams, even though your Mac or Net connection may not be fast enough to do both. Preference settings let you adjust how the incoming data is divided between audio and video and how much processor time your Mac will dedicate to playing a stream. The former lets you focus on one stream at the cost of the other, while the latter ensures that background playback won't come at the expense of your other computing tasks. Unless you've got a scream-

ingly fast Mac on the end of a monstrous data pipe, you'll probably want to keep the slide toward the audio side of the scale.

### CU-SeeMe

CU-SeeMe is netcasting's grizzled veteran. Created in 1993 at Cornell University and eventually purchased by White Pine Software, CU-SeeMe was designed as a videoconferencing application; if you've got the camera and microphone hardware, you can videoconference over the Internet with other CU-SeeMe users. But even without netcasting your own grinning mug, you can sign on to conference host machines known as *reflectors*, and take part in videoconferences or netcasts. CU-SeeMe doesn't work as a Web-browser helper application—you have to type in the reflector address directly. When you're in a CU-SeeMe videoconference, it's considered impolite to flood the reflector with a high data rate, so if you're on an ISDN or faster line, keep an eye on your transmission levels. Also, you can manage your incoming data levels by hiding or making visible conference participants who are transmitting video signals.

CU-SeeMe is still popular with event netcasters such as Apple, which uses the software in connection with its QuickTime Live events. Because CU-SeeMe broadcasts both video and audio, it carries a hefty preferences screen; fortunately, White Pine has put together a comprehensive and coherent Apple Guide, which comes with the client installer.



et with its sequence and destination information, and sending those packets out on crowded city streets during rush hour with a series of bike messengers. Each courier takes whatever route is most convenient at the moment and will likely be delayed at random moments; some may not even arrive, requiring the originator to resend that particular packet.

When you're receiving an E-mail message or the front page from a Web site, it doesn't particularly matter if the packets arrive out of order, or if there's a gap of a few milliseconds between packets. Both the TCP/IP network protocol and your software are designed to deal with such service interruptions. But audio and video presentations are time-based, which means they require not just that the data be present, but also that it appear on screen at a consistent, preset rate.

To accommodate this requirement, netcasting clients use a *buffer*, which is like a data-holding tank with a pipe leading in and a pipe leading out. After requesting a stream from the netcast server, the client spends the first few seconds of the broadcast filling the buffer with data. Once the buffer is full, the client begins playback: opening the out pipe and drawing forth a smooth stream of data. With this method, it doesn't matter if the data coming from the server arrives in fits and starts, as long as there is enough of it to keep the buffer full.

### Taipei via Internet

For many local stations, netcasting is a way to draw a national or international audience. Says Sean O'Toole, vice president of business development for Xing, "One of our first customers was a radio station in Taiwan, and now

somebody who left Taiwan to come to America can log in and listen to their favorite local stations from home."

Tom King, whose CompuTalk show will soon be on 40 radio stations, notes that netcasting broadens his audience base even just a few miles away from his transmitter. He says, "You can't get my signal in your downtown concrete [office] block, but you can listen to it over the Net." Furthermore, King says, "calls are starting to come in from [radio] markets that we're not in. We had someone call in from Anchorage, Alaska."

## Web Picks: Finding the Feed

Think Web surfing is addictive? Wait until you try tuning in to radio stations across the country, courtesy of the Net. Right now, the sound is pretty bad, but when you can get FM stereo reception over a 28.8-Kbps modem (coming, but probably not for a year at least), it will almost be worth installing a second phone line just to maintain a daily live feed.

Currently, if you're listening to a live audio netcast, the chances are good that you're picking up an AudioNet stream. AudioNet uses RealAudio to broadcast live concerts; more than 50 sports, music, and talk-radio stations; and major-league, minor-league, and collegiate-level sporting events. Though its selection is limited to stations with which it has relationships, at least AudioNet provides a description of the audio you're about to pour into your ears.

The same cannot be said for Web Times (<http://www.canadas.net/WebTimes/>), a Canadian site that organizes live audio and video shows by station and time slot, but uses the first name of the show's host to link to the netcast stream. You can investigate the content yourself by linking to the stations' sites, but would it have killed the Web Times editors to offer even a two-word clue about what's on the other side of that link?

Obligatory Meta-List Reference: Yahoo's list of netcast lists (<http://www.yahoo.com/News/Events/Netcasts/Indices/>).

And the Webby award goes to **Addicted to Noise**. The banner graphics have changed (crossed guitars instead of syringes), but the song remains the same at Addicted to Noise (<http://www.addict.com/>), a Webzine dedicated to rock and roll—and the louder, the better. A recent "Hi-Fi" redesign adds improved graphics and design, and though the design uses Netscape frames, it's still palatable. Beyond its visual appeal, ATN features enthusiastic and knowledgeable writers, and the articles are positively saturated with accompanying audio clips. Stories tend to run a bit long, and the kids just love them four-letter words, but you could look a long time and not find a better high-energy media/culture fix.

For some, netcasting has provided a complete business opportunity. Mark Cuban is president of AudioNet, a company that essentially rents out server space to anyone who wants to get into netcasting. "We've got 75 servers spread out around the country, and bandwidth on all the major backbones," says Cuban. "We can probably handle 17,000 to 18,000 simultaneous users [for a single event]." Radio stations send in their audio feed over an ISDN or phone line, and AudioNet pipes it out over the Net. In exchange, the station gives AudioNet advertis-

ing time spots that the company can use or resell.

AudioNet also maintains a small library of albums and some recordings of speeches by famous political figures. Not surprisingly, Cuban is bullish on netcasting's future, saying that he expects to see FM-quality stereo audio possible over a clean 28.8-Kbps connection within 12 months.

### Comes the Revolution

Netcasting has a potential impact on a still grander scale. To netcasters, the Net is simply a medium over which they can deliver their audio and video streams. This may seem obvious, but over the last two years, nearly all the attention has focused on the World Wide Web to the point that many people equate the Internet with the Web: a virtual space that one inhabits. While it's likely that cruising cyberspace is a fad that will fade, the pervasive local connections, and the infrastructure to support them, will remain.

Netcasting may be one of the first incarnations of the Internet as a pure delivery medium, but it won't be the last. In the future, you won't have to go and find things on the Internet—they will come and find you. With apologies to songwriter Gil Scott-Heron, this is the revolution, and it will be netcast. **m**

Associate editor CAMERON CROTTY ([cameron@www.macworld.com](mailto:cameron@www.macworld.com)) covers the Internet for Macworld.

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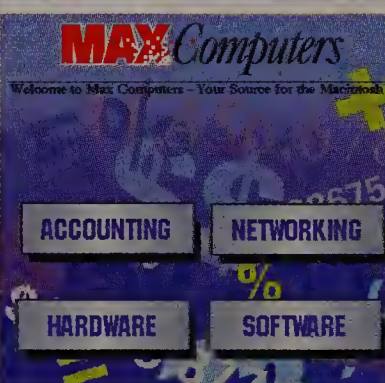
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# Media

## Caution: Platform Crossing Ahead

WHAT TO WATCH FOR WHEN DEVELOPING FOR WINDOWS

by Jim Heid

**Y**ou hear the statistic all the time: six out of ten multimedia developers use the Mac. It's not surprising. Since blazing the DTP trail a decade ago, the Mac has been the platform of choice for creative types. While most media developers use the Mac, most media consumers use Windows. This presents numerous challenges for the 60 Percent Club. From graphics, fonts, and file names to audio, video, and CD-ROM formats, things work differently over there. Even among Macs, there's variation; when you think about it, "cross-platform" really means "any machine other than the one used to create the original content."

This month, I focus on the hurdles Web-site and CD-ROM developers must leap when crossing platforms. The goal: create a product that functions on both platforms and looks as consistent as possible. Many topics addressed in *Media* this year have cross-platform wrinkles (check out April for sound, May for color palettes, June for antialiased text). You'll find examples and links to more information on my Web site, <http://www.heidsite.com/>.

### Font Foibles

Text presents several pitfalls. Windows screen fonts display larger than their Mac counterparts. For CD screens, assume that line endings will change (or use bitmapped text). Web surfers can change



line endings by resizing the browser window and changing the text's font and size.

Special characters often translate improperly in a CD-ROM title; avoid them unless your authoring program can handle the translation. In HTML you can get bullets (&#149;) and em dashes (&#150;), but not all browsers support them (Netscape Navigator and Microsoft Internet Explorer do).

You can't tell what fonts an end user has, so for a CD-ROM title stick with standard system fonts (or license or cre-

ate a screen font and require users to install it). Times and Helvetica are safe if dull choices; Windows usually displays their look-alikes, Times New Roman and Arial.

On the Web, the forthcoming OpenType standard, a collaboration between Adobe, Microsoft, Apple, and others, promises the ability to embed fonts in Web pages. But it's too soon to say how well it will work (for more on OpenType, see *News*, *Macworld*, September 1996).

The safest way to avoid font problems is to use bitmapped text—pictures



## WHO BUILDS THE BEST BRIDGE?

When embarking on a cross-platform project, seek out the tools that make the trip as painless as possible.

**AUTHORING TOOLS** Many authoring programs provide cross-platform development features, but Macromedia Director and Authorware (\$4995) handle the challenges best. For starters, they're available on both platforms—many authoring programs, such as Apple Media Tool and mFactory's mTropolis (\$1995; 415/548-0600, <http://www.mfactory.com/>), require that you

use the Mac for development, and include only run-time playback support for Windows. This approach forces you to build a Windows run-time player every time you want to test a project under Windows. (A Windows version of mTropolis is in the works.) Director and Authorware can swap projects directly between platforms. You can rough out a project on the Mac, move it to Windows, tweak it, move it back to the Mac for refinement, and so on.

Director and Authorware also provide niceties that address typical cross-platform headaches. For ex-

ample, both programs support font mapping: you can specify which Windows fonts to substitute for specific Mac fonts. Director even lets you map font sizes so that, for example, text formatted in 14-point Times on the Mac appears in 12-point Times under Windows. And Authorware includes a set of cross-platform TrueType fonts that you can distribute free of charge with your project—no licensing required.

**CONTENT-CREATION TOOLS** If you plan to use both platforms throughout the development process, you can streamline your work and minimize file-conversion chores by using programs that are available on both,

such as Adobe Photoshop, Illustrator (\$595), and Premiere. Macromedia's Director Multimedia Studio (\$1999) and Authorware Interactive Studio (\$4995) are dual-platform suites that include authoring software, as well as xRes for image editing and Extreme 3D for modeling, rendering, and animation. Both of these suites include audio programs, but not ones that are identical on both platforms.

As for audio, Digidesign (415/842-7900, <http://www.digidesign.com/>) is the best source for audio products that are available on both platforms. And Waves' WaveConvert utility is available for both Mac and Windows.

of text created in a program such as Adobe Photoshop (\$895) or ScreenReady (\$199; 415/961-4400, <http://www.adobe.com>). You can format such text to your heart's content and get smooth, antialiased characters. The downsides: antialiased text smaller than 14 points is hard to read, and graphic text isn't searchable, prints poorly, takes up more space, and takes longer to load.

### Graphics Gotchas

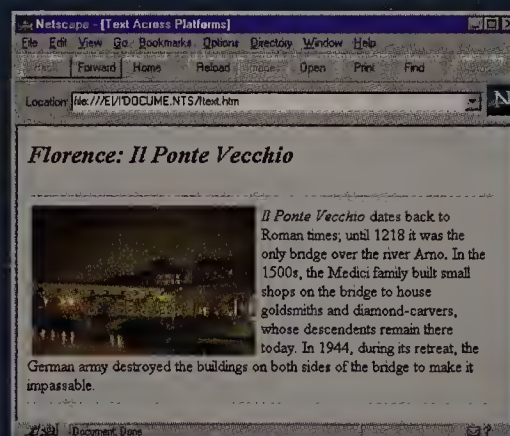
The Mac and Windows 256-color palettes differ, which can cause bizarre color shifts in images prepared for 256-color systems. For CD-ROMs, you can create custom color palettes in Photoshop or Equilibrium's DeBabelizer Toolbox (\$399; 415/332-4343, <http://www.equilibrium.com>). For the Web, dither to the system palette (for 8-bit images) or create a custom palette and require site visitors to have 16-bit or better color video.

Regardless of how many colors you have, there are differences in *gamma*—in essence, screen brightness—between Mac and Windows monitors. Images prepared on the Mac often look too dark and contrasty in Windows (see "Tweaking Gamma"). If a CD's image quality is critical, you can create separate images for each platform. But this approach makes development more complex, and the images need twice the space.

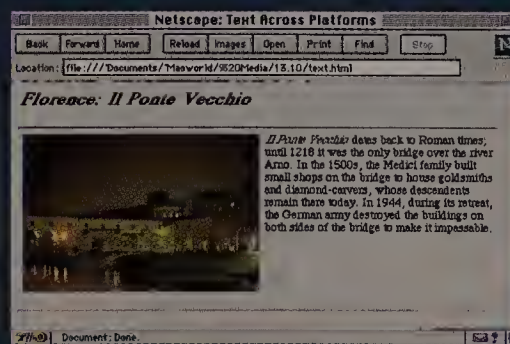
For CD development, authoring programs that link the run-time player to external disk files containing screen graphics often impose file-format restric-

## TEXT ACROSS PLATFORMS

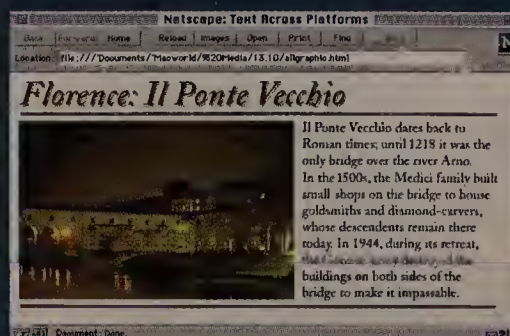
Not even text can survive a cross-platform journey unscathed. In the first two examples, Netscape Navigator is set to display text in 12-point Times.



Because Windows fonts are larger than their Macintosh counterparts, the line endings differ and text blocks take up different amounts of space.



This Macintosh doesn't have a true italic version of the Times font installed; the Mac OS creates an ugly pseudo-italic by slanting the roman version of the font.



All of this text was created in Adobe Photoshop. Using bitmapped text eliminates worries over line endings and installed fonts; bitmapped text also makes possible special effects such as drop shadows and antialiasing. The downside is that the image is larger and the text isn't searchable.



tions. Apple's Apple Media Tool (\$495; 408/996-1010, <http://www.apple.com>), for instance, requires that all bitmapped graphics in a title be PICT files. Macro-media Director (\$850; 415/252-2000, <http://www.macromedia.com>), on the other hand, converts imported graphics to its own format, which both the Mac and Windows flavors of Director support.

## Audio Aggravations

Many Mac programs are preset to a 22.254kHz sampling rate. That rate, common on the Mac since its early days, is standard nowhere else, and it's not an even multiple of the 44.1kHz CD-quality rate. Some Windows sound cards handle 22.254kHz audio improperly. When you want 22kHz cross-platform audio, specify a sampling rate of 22.05kHz. If small files are more important than audio quality, use 11.025kHz.

If the original audio was recorded at a different sampling rate (say 44.1kHz), to get the best quality, resample in an audio-optimizing utility such as Waves' WaveConvert or AudioTrack (\$300 each; 423/689-5395, <http://www.waves.com>). For QuickTime movie soundtracks, consider using IMA (the Interactive Multimedia Association's relatively new compression standard). Terran Interactive's wonderful Movie Cleaner Pro 1.2 (\$189.95; 408/278-9065, <http://www.terran-int.com/>) can IMA-compress audio, as can Apple's Apple Movie Player utility.

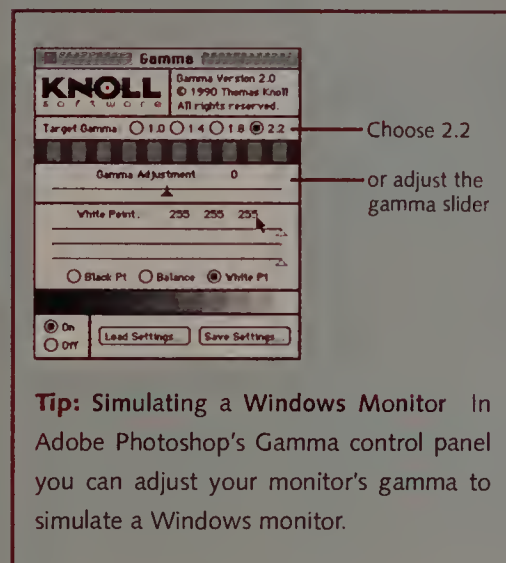
As for audio sound formats, AIFF is most popular on the Mac; WAV dominates on Windows. Many authoring programs support both, but some require a specific format for cross-platform development. Apple Media Tool, for instance, demands WAV format. Director's no-fuss sound-import method converts audio to an internal format supported on both platforms. Often it's better to link long audio passages to a project than to import them; in this case, use the AIFF format for both platforms.

## Movie Madness

The tips for still graphics also apply to digital video: create custom palettes for movies that will be played on 256-color systems, and consider tweaking the gamma to lighten up the movies for Windows. You can create a custom palette using Photoshop or DeBabelizer, and adjust gamma using the Adobe Premiere 4.2 (\$795) CD-ROM Movie

# Tweaking Gamma

IMAGES GENERALLY APPEAR darker and with higher contrast on Windows systems than on Macs. There are a number of ways to lighten an image so that it will display acceptably on a Windows machine. The following Adobe Photoshop technique, which was suggested by *Macworld* contributing editor Deke McClelland, is fast and easy. (One method you should avoid is the Brightness control in the Brightness/Contrast dialog box—it tends to turn black areas of the image a muddy gray and wash out highlights.)



**Tip: Simulating a Windows Monitor** In Adobe Photoshop's Gamma control panel you can adjust your monitor's gamma to simulate a Windows monitor.

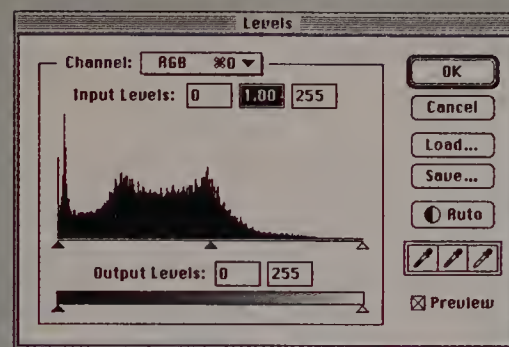
Maker plug-in or Movie Cleaner Pro 1.2.

You should also compress movies for smooth play from a CD-ROM drive and faster downloads. Movie Cleaner Pro is an ideal movie-cruncher. You must *flatten* a QuickTime movie—reorganize its contents—so it can play on both platforms. Use a QuickTime editor or player.

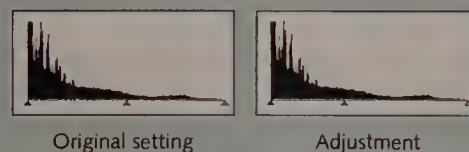
If you're posting a QuickTime movie on the Web, end its file name with *.mov* (for example, *sunset.mov*). This extension tells the browser to launch a movie-playback helper application or plug-in.

## Testing Tips

Be sure to cross platforms early and often. Explore your site using Windows machines with various configurations of monitor, graphics card, and browser. Test your CD project on as many machines as possible; recordable CDs or removable-media cartridges are good transfer tools, as is a network. For the latter, you need software that adds AppleTalk protocols



1. Choose Levels from the Image menu's Adjust submenu, or press **⌘-L**.



2. In the histogram area of the Levels dialog box, drag the middle triangle (which adjusts gamma) to the left to lighten the image. **Tip:** To increase the gamma in increments of 0.1 from the keyboard, press tab to move to the gamma text box, and then press shift-up arrow.



3. When the image looks just a bit too light (right), click on OK or press return.

to Windows. Miramar Systems' Personal MacLAN Connect (\$199 per user; 805/966-2432, <http://www.miramarsys.com/>) is the best of the bunch. Version 6.0 supports Windows 95's long file names.

As you test your work, don't be surprised if you hit more potholes. Installation hassles, CD-ROM SCSI configuration nightmares, and sound-card incompatibilities are just a few of the things that keep Windows developers' tech-support phones ringing. You'll appreciate anew how well multimedia works in the Mac world. And you'll wonder why 40 percent of all multimedia developers—and 90 percent of all computer users—haven't seen the light. **m**

## Next month: Optimizing the Power Mac 8500 for media

JIM HEID produced the CD that accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995).





## Stochastic Screening Brings Out the Details

by David Blatner

Whether you're watching a beautiful sunset from a screened-in porch or enjoying a Little League doubleheader from the bleachers behind the backstop, those screens break down the view into hundreds of little squares. By the time autumn rolls around, you're so used to them you hardly notice the screens are there.

The same is true for halftone screens, the technology we've all been using for years to print photographs and areas of color or gray. The halftoning process "screens" images by breaking them down into dots evenly spaced on a grid. Dots in darker areas are bigger, and those in lighter areas are smaller. The finer the grid, the less annoying the effect of breaking up the image.

However, unless you can print a *really* fine halftone screen, you'll always see some halftone dots. And there are other problems. First, a regular halftone grid loses details in the image. Second, when you print more than one halftone grid, stacking them on one another (as you do in color printing), you create the potential for moiré patterns. Third, there's even more danger of moirés if the image itself contains fine grids (like cloth or a checkered shirt).

### Enter Stochastic, Stage Left

Stochastic screening is an alternative to traditional halftone screening. It eliminates the regularly spaced grid of a halftone and instead uses a spray of very tiny dots that have no visible pattern; in dark areas the dots are closer together, in light areas they are farther apart. In some types of stochastic screening the dot size varies, too. (While the stochastic dots appear to be random, they are actually mathematically calculated; this is also called FM, or fre-

quency modulated, screening.)

Almost every time I open a magazine or catalog I see images that could have benefited from stochastic screening. So why don't more people try it? For some reason, many people think stochastic screening is only for the high-end graphics market. Not necessarily so! The midrange market—people doing newspapers, newsletters, magazines, and catalogs—may actually stand to gain the most. Silkscreen printers and flexographers (who print on a variety of media other than paper,

such as plastic and cans) are also finding stochastic screening very useful. And even if you're just printing to a laser printer, you can see significantly better quality using stochastic screening rather than traditional halftoning.

### How to Do It

There are basically three ways that you can screen your images stochastically.

- You can use diffusion-dither bitmap techniques. In Adobe Photoshop, for example, you can convert a grayscale image to Bitmap mode

## LOOKING THROUGH SCREENS

The traditional screening process breaks up continuous-tone images into regular grids of spots that can be reproduced in print.



Like a window screen, traditional halftones get between you and the image.



This coarse halftone (40 lines per inch) is finer than a window screen, but you still see spots.



and use the Diffusion Dither option to break up an image into tiny dots that don't have a regular pattern (though I can't really recommend it; it's too difficult to get good-quality stochastic images this way).

- You can use an image-setter. If you don't have one, find a service bureau whose system does stochastic screening. They may call it by the brand name: CristalRaster (Agfa), Diamond Screening (Linotype-Hell), ESCOR-FM (Prepress Solutions), and so on. If you have an imagesetter that's not equipped for stochastic screening, you'll need to upgrade it (which can cost thousands of dollars).

- Or you can use a utility like Icefields (\$895; Isis Imaging, 604/323-0033), which lets you convert gray-scale and CMYK images to stochastic images on your Mac and then print to almost any image-setter or laser printer. I have found this last solution to be quite effective, with quality matching that of more expensive products.

### Inevitable Pitfalls

While stochastic screening can make some images shine, it unfortunately sometimes gets a bad rap from printers who've misused it and gotten poor results. So it is important to know that going stochastic is not as easy as pushing a button, and it's not going to improve every image. The key to getting good results is educating yourself.

Find out what your printer is capable of. For instance, a printshop that can handle a 3 percent dot at 150 lpi should be able to handle stochastic screening. But don't just send a printer a stochastic job cold—discuss it first. If your printer says, "We can't print stochastic images," or advises you not to use the technology, you may be wise to find a shop with more experience

in using stochastic screens.

Proofing, too, can be a challenge because the dots are so small. Try different systems to find what works best for you (I've had luck with Fuji, Du Pont, and Matchprint, for example). Also, when the image hits the press, there will probably be significantly more dot gain than you're used to. You should adjust for this when the image gets screened (either in the imagesetter or in Icefields). Most stochastic systems let you set up a compensation table.

Finally, while stochastic screening can accentuate image detail, low-contrast areas within images often look grainy and mottled. For an image of a few clouds in the sky, you might choose conventional halftoning. But add ominous thunderheads, lightning, and a paisley umbrella to the scene, and stochastic could blow traditional away.

### Is It for Me?

When I first started working with stochastic screening, I thought, "This is the future of printing images." Now I know that it isn't: it's the present. And while I wouldn't use stochastic screening for everything, you can get amazing results by enhancing details and reducing patterning in many of your printed images. If you operate a service bureau, color house, or printshop, the decision to try it out is a no-brainer, especially with a lower-cost solution like Icefields. If you're an end user and your printed images look as if they were strained through a screen door, find someone who can imageset stochastic screens, and evaluate it yourself. **m**

DAVID BLATNER is a Seattle-based graphic arts consultant and coauthor of *Real World Photoshop* (Peachpit Press, 1996). You can reach him at [david@moo.com](mailto:david@moo.com).

# Compare and Contrast

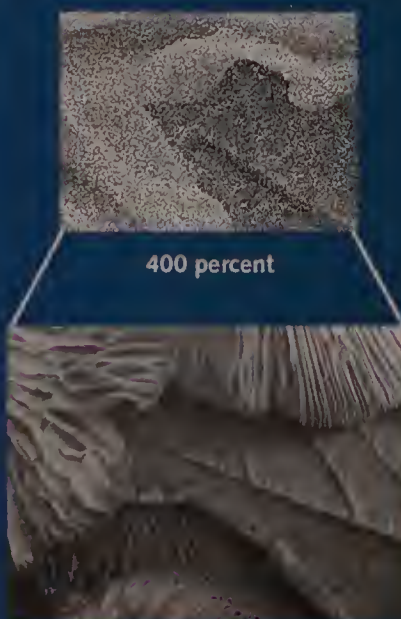
Different images take to stochastic screening differently. Compare the stochastic versions (created with Icefields) with their traditional counterparts.



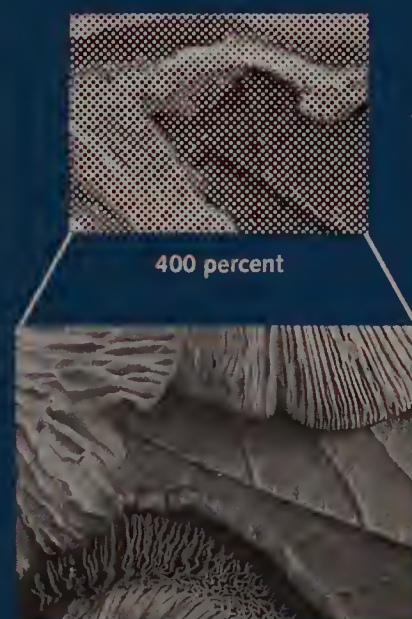
CMYK—STOCHASTIC  
Soft quality is more like original



CMYK—HALFTONE



GRAY-SCALE—STOCHASTIC  
Detail is enhanced



GRAY-SCALE—HALFTONE




CMYK—STOCHASTIC  
Lower-contrast areas often appear more grainy



CMYK—HALFTONE





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# Copyright and the Visual Arts

STAYING LEGAL IN THE DIGITAL ERA—IT'S TRICKIER THAN YOU THINK

by Marjorie Baer

**T**he digital revolution, it appears, has made artists and publishers of us all, simply by giving us access to a wide array of inexpensive, easy-to-use tools for creating, copying, manipulating, and reproducing works of imagination. If you can think it, you can do it, the advertisements tell us.

In corporate boardrooms, million-dollar deals are clinched on the basis of professionally produced multimedia presentations and convincing advertising layouts. And increasing numbers of illustrators and fine artists are turning to the new media—draw programs and image-editing software, digital cameras, scanners, video-capture devices, and so on—for both professional work and personal expression.

The problem is, the same powerful tools that make your original creations possible are also unsurpassed tools for infringing copyright. The practice of copying artwork did not originate with the advent of computer technology, of course. We would know little of classical Greek sculpture had it not been for the ancient Romans' raising the skill of copying to an art form in itself. But now-commonplace digital tools make capturing and modifying images nearly effortless—and the problem of copyright infringement is becoming increasingly widespread.

Although some people intentionally misappropriate the work of others and present it as their own, or upload copyrighted images to the World Wide Web, knowingly publishing what was not theirs to publish, the vast majority of copyright violations are probably committed through ignorance—and not only by amateurs, but by creative professionals working for advertising agencies, print

publications, design firms, and software companies.

Even an unintentional infringement is an infringement, however, and the bottom line is this: No matter how an infringing work comes into being, both its creator and its publisher can be enjoined from publishing it further and required to pay damages and other costs. Whatever your profession, if you work with images, a solid understanding of

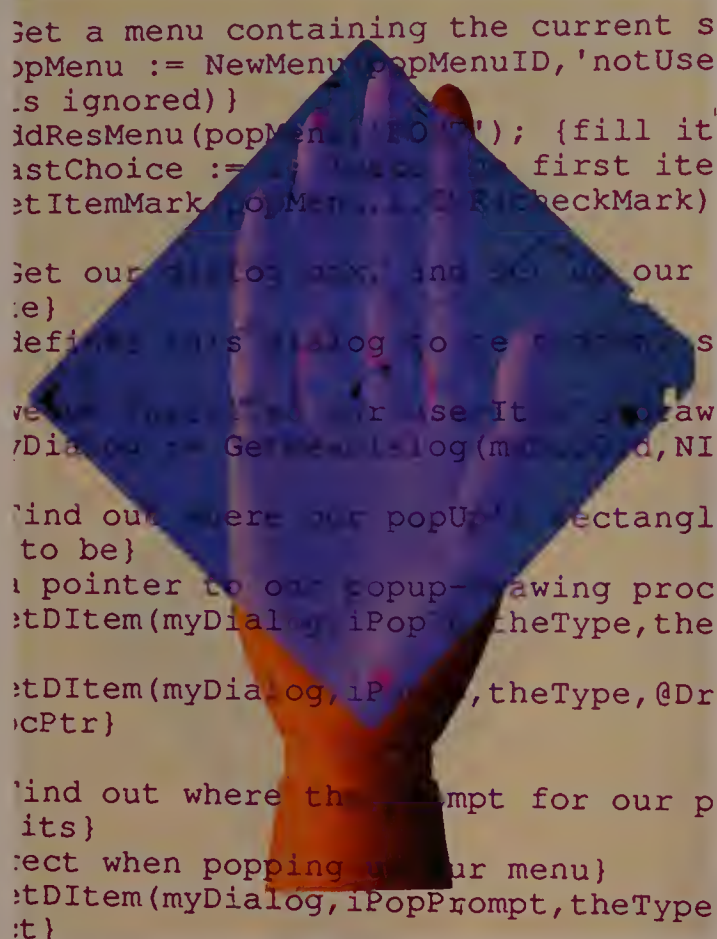
derivative works. (Copyright protects many different kinds of works—text, images, dance, music, and so on—but since our concern here is with images, we will speak in terms of visual artists.)

The creator's rights apply automatically the moment the original work is "fixed" in a tangible form by whatever means—scribbled on paper, captured on film, or saved to disk—regardless of whether it is ever published or displayed.

The artist who is concerned about copyright protection need not seek an attorney's counsel, fill out a form, or even, as of 1989, include a copyright notice on the work if it is published. (Artists should note, however, that the inclusion of a copyright notice may deter some potential violators and still has some limited legal significance.) Should your work be infringed, however, you will have to register it with the U.S. Copyright Office to file suit; if your work was already registered at the time the infringement occurred, the guilty party may be required to pay statutory damages as well as attorneys' fees.

If you want to use an artist's work—for example, to reproduce all or a significant part of it, distribute copies, or make "derivative works" based on or incorporating the original—you must get permission to do so. This sometimes entails paying a licensing fee. Any unauthorized use of the work is considered an infringement.

Images that are not protected by copyright—for example, because the copyright has expired—are said to be in the public domain, meaning that they may be copied without permission. Don't make the mistake of assuming that just because a work is old or well known, it must be in the public domain. Unless an artist voluntarily puts a work into the



```
Set a menu containing the current s
PopupMenu := NewMenu(popMenuID, 'notUse
is ignored)
idResMenu(popMenu, 'FOOT'); {fill it
astChoice := 1; {make the first ite
stItemMark(popMenu, 1, 0, kCheckMark)

Set our dialog box, and set up our
e)
defines this dialog to be a dialog s
ve as possible to use it. Draw
Dialog := GetNewDialog(modID, NI

Find out where our popUp is (rectangl
to be)
a pointer to our popup-drawing proc
stDItem(myDialog, iPop, theType, the

stDItem(myDialog, iPop, theType, @Dr
icPtr)

Find out where the prompt for our p
its}
rect when popping up our menu)
stDItem(myDialog, iPopPrompt, theType
it}
```

how copyright applies to the work you do is an essential part of your portfolio.

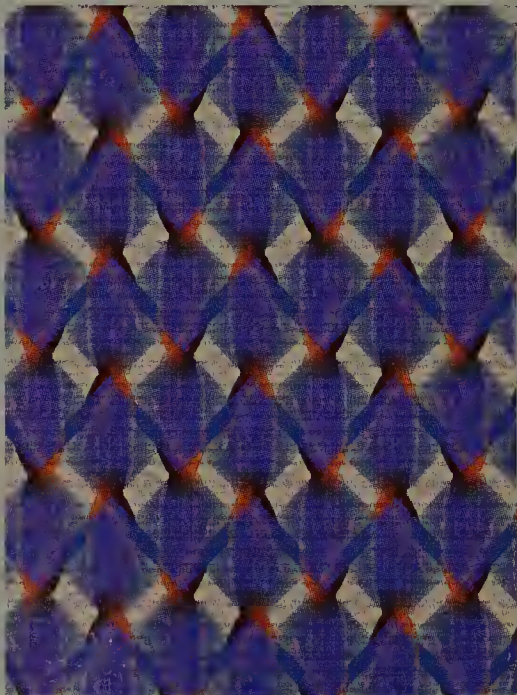
## Protecting Creative Expression

The effect of copyright can be stated relatively simply. The law gives the copyright holder—usually the creator of a work, but under certain circumstances the person who commissioned it—"exclusive rights" over the work's reproduction, distribution, display, or use as the basis for



# What's Wrong with This Picture?

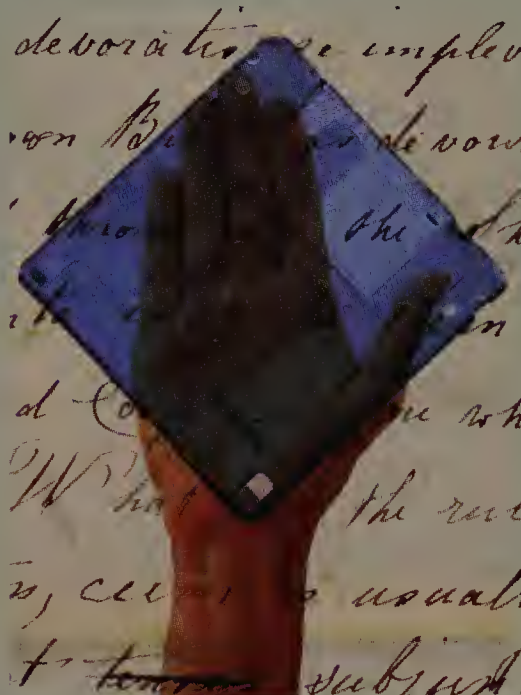
ASSESSING WHAT IS LEGAL COPYING CAN BE both tricky and subjective, even for copyright experts. To give you a sense of the kinds of traps artists and publishers can fall into, we asked illustrator Diane Fenster to create the six images shown here. In the context of this article (and because Fenster is copying her own work throughout), the potential violations illustrated are all hypothetical. If they were not, five of them would probably be found to infringe copyright; the other use is probably a permissible one. Each image takes as its starting point Fenster's photomontage on the first page of this article, which she adapted—with permission—from a work by photographer Scott Morgan.



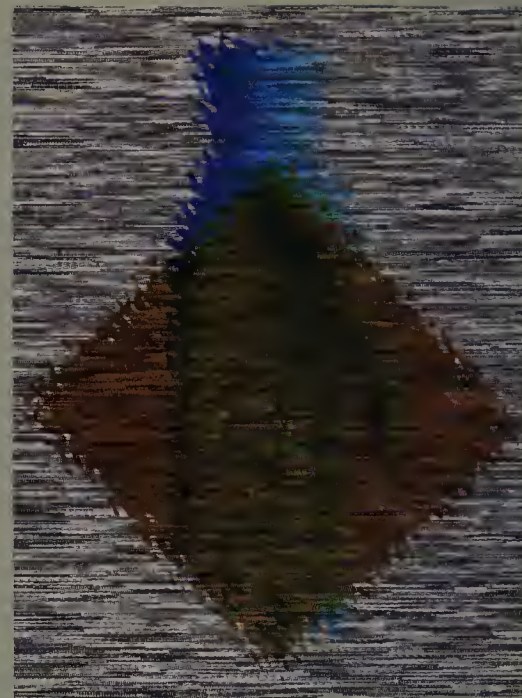
**Danger** Fenster used Xaos Tools' Terrazzo to create this tiled pattern for fabric or gift wrap. Simply repeating the image over and over at this reduced scale produced something even the originator might have trouble recognizing at a glance. This does not, however, change the fact that it began from, and in final form recognizably repeats, a substantial taking, and hence infringes.



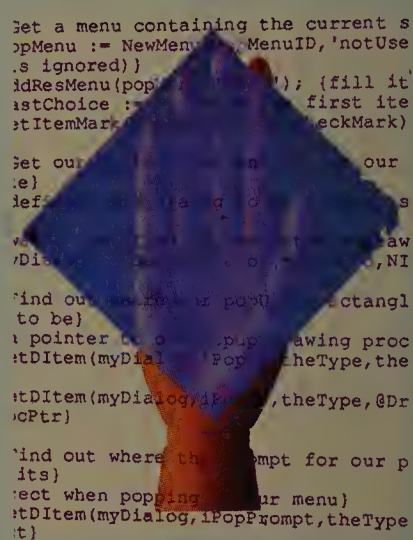
**Danger** We'll start with an easy, clear-cut infringement. Cyber Cindy's Web site includes a virtual gallery of images she collects from various sources and displays unchanged. Having not sought the artists' permission to do so, however, she is infringing upon their right to control the display and publication of their works. And even though she doesn't charge for the downloads, in making the works available she is giving away something that is not hers to give.



**Danger** Fenster, inspired by the original (see image at right), combines rather ordinary objects and composes them in a similar way using similar colors. She uses a human hand instead of a mannequin's, and an old, handwritten letter instead of typewritten programmer's code, and could make a case that her image expresses a different mood from the original. Although the idea of depicting any one of these ele-



**Danger** Here Fenster scanned the source image, replaced the text layer with simulated video noise, then flipped the image vertically, inverted the colors, and applied the Ripple filter—all straightforward, out-of-the box operations. Although the result is substantially different from the source, it violates the original by taking a significant and recognizable portion of it—the hand and disk—elements that are central to the original composition.



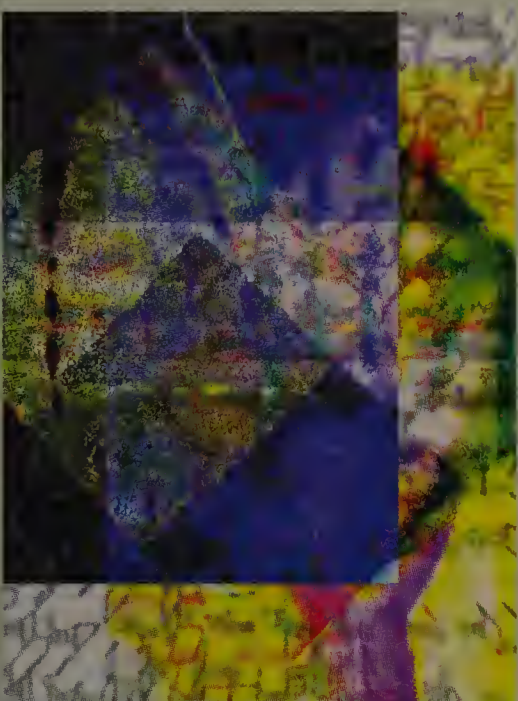
ments cannot be protected, this composition juxtaposes all three elements in a way that so clearly copies particular details from the original that the artist is seriously at risk of an infringement claim. She could have composed these elements in many other ways without infringing the original image.

Just as an artist would be foolish to run the risk of infringing copyright in this way, an art director or publisher would be unwise to assume the legal risk of accepting this work without first getting permission from the original artist.





**Danger** Here, the source image appears almost in its entirety, resized slightly, and its colors toned down so that it almost fades into the background. Although in this collage for a book cover the source image is a relatively subordinate element, it clearly is a substantial taking from the original. The fact that it is integrated into a very different context does not make it any less an improper taking.



**Safe Going?** Although Fenster began by scanning the entire source image, her successive manipulations yield a work so dramatically different that the original is now nearly unrecognizable.

public domain, it remains copyright-protected for a very long time: until 50 years after the artist's death; or in the case of collaborative works, 50 years after the death of the last remaining contributor. Works created for hire are protected for 100 years from the date of creation or 75 years from the date of publication.

### Traversing the Infringement Minefield

So far, so good. But while the broad concepts of copyright can be outlined fairly simply, the application and interpretation of the law are anything but simple. Copyright law frequently requires making abstract and subjective judgments. Attorneys advise and courts rule on questions involving the very nature of the creative process—they attempt to distinguish between art that permissibly borrows only ideas from other work, and work that steals “protected expression.”

If that sounds easy to you, you're missing the point. Try spotting all the potential infringements in the following hypothetical scenario. Remember, copyright does not protect an artist's idea or subject—crows flying over a windblown wheatfield, say—only the specific expression of that idea; for example, van Gogh's 1890 oil painting of the subject.

Imagine that an artist, inspired by van Gogh, scans a photograph of a field from a recent coffee-table book, and adds a piece of blue sky removed from a picture in a CD-ROM stock-image collection. She then downloads from the Web an image of birds in flight, which she skillfully reworks with stock Adobe Photoshop effects and superimposes on the composition. The result is a digital image strongly reminiscent of van Gogh's painting. Has she infringed? Several times over, without once hearing warning bells in her head.

Scanning the wheatfield picture from the coffee-table book likely violated the copyright of the book's photographer, whose name appears in the credits of the book and who thus could have been contacted for permission. Incorporating this image in the new composition created an unauthorized copy of the photographer's work, for which the artist should have paid, even though she was adding other content to it.

As for the stock image from the CD-ROM, many such collections come royalty-free. Unfortunately, the collection

from which our artist selected her sky was not one of these; she simply forgot to check. But since all she took from the stock image was a nondescript patch of blue sky, it may not constitute an infringement. The judgment depends on whether the amount taken is a significant piece of the original—quantitatively or qualitatively. If the patch of sky contained some fanciful cloud formations, even a relatively small taking might be an infringement.

The birds pose another problem. If the artist altered their composition and formation enough that the resulting image shares little more with the source than the notion of birds in flight, that would not be illegal. But how different does different have to be to protect her from the legal system? The law tells us there must be no “substantial similarity,” a phrase that is just about as vague as it sounds. Speaking practically, if our artist can recognize the details of the original in her altered version, she may have an attorney in her future.

(One important point frequently overlooked is this: the law currently remains unsettled on so-called intermediate copying. That is, it is not yet clear whether an artist may legally make an unauthorized copy to work with, even if the final creation is worlds away from the original. Until that question is clearly decided, be advised that scanning or photocopying any copyrighted image without permission may put you in jeopardy, no matter how different your finished product might be.)

What about our hypothetical artist's final image? Van Gogh is of course long dead, and his paintings are in the public domain, free for all to copy. If van Gogh were alive today, though, he might be calling his counsel, depending on the nature of the similarities between his original and our artist's effort. If all she did was create a new work in van Gogh's style, she may be safe. The idea of working in van Gogh's style is not protected by copyright; after all, Fractal Design's Painter ships with ready-made “Van Gogh” brushes and filter effects. If the resulting artwork borrowed detailed expression from the source, however, van Gogh might win his case.

Let's give our artist another project—an illustration for a magazine article on fine dining. Again working from various sources—all legal this time—she pro-



# Copyright Questions and Answers

## How much of a copyrighted image can I legally use?

Seek permission even if the amount you plan to use is a small portion of the original image. (Note that its size or importance relative to *your* work is not relevant. It could be a tiny, almost unnoticeable element of your composition and yet still infringe.) If what you copy is not a substantial portion of the original and is relatively unimportant to the whole, you may not be infringing, but that can be a delicate call, so be careful.

• • •

## Does copyright protection mean I can't look at other artists' work for inspiration?

Not at all, but it does mean you need to be conscious of the distinction between drawing inspiration from an artist's ideas or style and illegally imitating particular original expression. Unfortunately, drawing distinct lines between the two is frequently very tricky.

• • •

## What about copying historical works of art that are now in the public domain?

Copying public-domain artwork is permissible, whether you have direct access to the original—sketching the painting or sculpture in a museum, for example—or working from a photograph or other reproduction. But be careful about incorporating a photograph of a work of art, even if you know the subject to be in the public domain. If you can legally arrange to take a photograph of the public-domain artwork yourself, you're on safe ground, but many museums prohibit you from photographing works in their collections. Museums often sell slides of works in their collections, but these are generally copyright-protected photographs, so be sure you have permission if you want to use them directly.

• • •

## What if my client presents another artist's work to use as a model?

As Mary Carter points out in *Electronic Highway Robbery* (Peachpit Press, 1996), this is not unusual, but it is dangerous. You need to tread very cautiously, and you may need to tactfully educate your client (or creative director) about your legal liabilities—and the client's. Before you even look at the example artwork, try setting it aside and asking specifically what about the work attracted the client's attention. Be careful that abstract terms such as *mood*, *energy*, or *style* are not masking a request to

appropriate particular expressive details. Even though there are a million ways to convey mood or energy—through color, composition, lighting, special-effects filters, and so on—to avoid the dangerous “substantial similarity” trap, you must use your own creative techniques.

• • •

## What if I create an illustration using all my own images and the standard tools of my profession, and the result comes out looking like someone else's work? Am I guilty of infringement?

Possibly. Two artists could independently come up with strikingly similar images, particularly now, with the widespread use of ready-made special-effects filters. If you never saw the other artist's illustration until after you had completed yours, you have not infringed. But if you had prior access to the earlier work, you might be found liable. This need not mean physical access to the original and the means to photograph or scan it. If you were inspired consciously or unconsciously to create something substantially similar, you've infringed.

• • •

## What if I credit an artist whose image I've used?

Even though you're acknowledging that someone else created the image, attribution by itself is not a defense against a charge of infringement. Ironically, it's probably an admission of copying. If you don't obtain permission to use an image, you could be found to have violated the copyright holder's right to control the use of his or her work.

• • •

## Do I have to hold a copyright on images I create? What if I want to permit other people to use them?

You may voluntarily place your own work in the public domain—say, when uploading an image to the Web—simply by including a notice that you are doing so, somewhat the way shareware authors do. You might want to restrict permission to nonprofit uses, requiring a licensing fee for commercial use.

*This article addresses only some of the copyright issues of interest to graphics professionals. Macworld's recommendations are intended only as guidelines, and not as legal advice. For legal advice regarding these or any copyright questions, contact an attorney.*



duces a simple but striking photomontage of a lone diner at a candlelit table, seen through a bistro window. What if another artist using similar techniques had already achieved a similar image—for an unpublished advertising comp, for example? Has our artist infringed that work? Again, the answer is maybe. If she had prior access to that earlier work—even just to see it and record it mentally—the case might be made that she copied that artist's expression. If the first artist sued, the judgment would hinge on a finding of "substantial similarity," which can be a very subjective decision.

Let us take this hypothetical case one step further. Say the court has decided that indeed, our artist's image infringes the copyright of the prior work. What if she produced it on assignment to illustrate a short story? Is the magazine that made the assignment, approved the submission, and published the story also liable? Yes. Everyone involved with the publication of that image is liable, even if the publisher had no idea that the artist was borrowing other people's work. The artist and magazine could be made to pay damages to the holders of the various copyrights—just one more reason all parties should be fully informed about their legal responsibilities.

### Practical Precautions

As a graphics professional, you should develop an internal copyright-infringement detector that clicks into operation the instant you use an image you didn't create yourself, whether you scan it, download it, or manually reproduce it from scratch—and whether or not you subsequently manipulate the image or combine it with others, such as to make a collage. Artists sometimes mistakenly believe their copying is legal under the "fair use doctrine," which permits unauthorized copying in certain limited circumstances including criticism, news reporting, teaching, and scholarly research.

Be aware that fair use seldom applies to the use of images in graphic design. So, if you want to use another artist's work, get permission. This applies even if you use only a small portion of the entire image, especially if that portion is an important element of the whole. Your best bet is simply to avoid close calls; if you are worried that you may be treading close to an infringement, do something different.

## WHERE TO LOOK FOR MORE INFORMATION

Although there is a wealth of general information on copyright available in print and online, relatively little is specific to the issues that most concern visual artists. Here are a few that you may find helpful.

- **The United States Copyright Office** (<http://lcweb.loc.gov/copyright/>) is an extensive and well-organized source of information ranging from general provisions of the law to specific concerns such as registering visual works of art and conducting a copyright search. You can correspond directly with the Copyright Office, download application forms, and link to other Internet sources on copyright.
- **The Copyright Website** (<http://www.benedict.com/>) is an entertaining and useful site maintained by attorney P. J. Benedict O'Mahoney. O'Mahoney offers news and general information on copyright, a handful of infringement case histories, citations to printed sources, and links to many copyright-relevant Internet sites.
- **Copyright and Intellectual Property Resources** (<http://www.nlc-bnc.ca/ifla/III/copyright.htm>) is a comprehensive, frequently updated listing of sources on copyright that includes many Internet and Web addresses.
- **Electronic Frontier Foundation "Intellectual Property Online: Patent, Trademark, Copyright" Archive** ([http://www.eff.org/pub/Intellectual\\_property/](http://www.eff.org/pub/Intellectual_property/)) provides general information on copyright and links to other sites, plus many articles from various sources debating the issues in this evolving legal arena.
- **Copyright in Visual Arts**, by Thomas G. Field, Jr. (Franklin Pierce Law Center, 1995) (<http://www.fplc.edu/TFIELD/CopyVis.htm>).
- **Nolo Press** posts articles on its Web site about aspects of copyright (<http://www.nolo.com/intprop.html#2>). Nolo also publishes a series of self-help law books on intellectual-property issues, including *Patent, Copyright & Trademark: A Desk Reference to Intellectual Property Law*, by Stephen Elias, and *The Copyright Handbook: How to Protect and Use Written Works*, by Stephen Fishman.
- Mary E. Carter's book **Electronic Highway Robbery** will be published by Peachpit Press in July. She covers many of the same issues in her article "Mother, May I?—Frequently Asked Questions About Copyright Issues," in the May 1996 issue of *Corel Magazine*.

The following books are written for attorneys, but if you need to consult the chapter and verse of copyright law, here are your sources:

- **Copyright Principles Law and Practice**, by Paul Goldstein (Hill and Wang, 1989).
- **An Unhurried View of Copyright**, by Benjamin Kaplan (Columbia University Press, 1967).
- **Latmans The Copyright Law**, by Alan Latman (Bureau of National Affairs, 1986).
- **Nimmer on Copyright**, by Melville B. Nimmer (Matthew Bender, 1978).

To be absolutely certain you're not violating copyright when creating an image, you have a few options. The first, and in some ways simplest, is to use only your own original artwork. That route isn't for everyone, however. If you need to incorporate images from other sources, use royalty-free sources, such as those available in clip-art, stock-photograph, and background-texture collections, and the like. Note that not all collections are royalty-free, so be sure to read the fine print before you select your images. If you need to use copyright-protected images, obtain permission.

Remember, the purpose of copyright is to protect and reward original creative effort—just as you want your

own efforts protected and rewarded. If you need help locating the copyright holder, the Copyright Office staff can conduct a search. For quicker though more costly service, you can contact a copyright attorney or agency specializing in rights and permissions (often referred to as a clearance house). The search can sometimes be time-consuming, but it is part of your professional responsibilities, and you should consider clearance costs when you calculate the overall cost of a project. ■

Senior editor MARJORIE BAER is the coordinator for *Macworld* departments. *Macworld* would like to thank Scott Morgan for the use of his original photograph.



# Graphics Workshop

## Colorizing Black-and-White Photographs

by Cathy Abes

**ARTIST** An artist and illustrator based in Venice, California, David Peters specializes in photo collages. In addition to

doing commercial work for such clients as Universal Studios, *Time*, and *Air & Space/Smithsonian*, he teaches computer illustration at Otis College of Art and Design in Los Angeles.

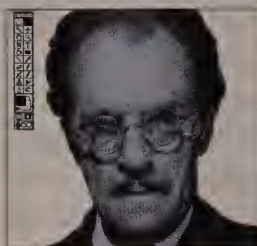
**HOW IT WAS DONE** The centerpiece of this photoillustration is a public-domain black-and-white movie publicity still from the 1940s, which Peters colorized in Adobe Photoshop. He prefers working with old photos because they tend to have denser grain patterns that capture a wider range of grays, which Peters can translate into richer colors.

He began by analyzing the photo for clues about the original colors: Is the complexion pale or ruddy? Does the subject's hair appear blond or gray, or is it more likely to be brown or red? Do the eyes seem blue, brown, or hazel? It's best to start by colorizing the face, says Peters, because it sets the tone for all the other features. Once he's found the right skin color, he finds it easier to determine complementary hair and eye colors.

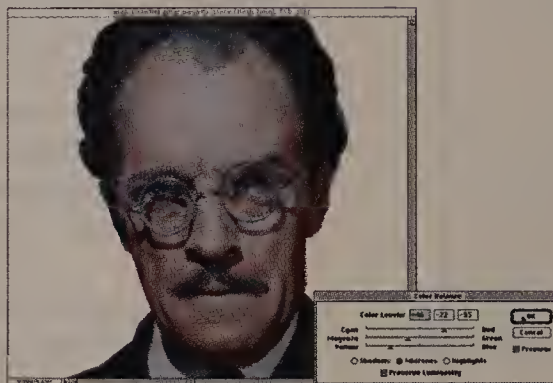
After initially colorizing each section—face, hair, glasses, eyes, and jacket—with Color Balance, Peters saved the section on its own layer, then made minor color adjustments with Variations.

Peters created all the background elements of the collage using Photoshop.

**THE TOOLS** **Hardware:** Mac IIcx with 32MB of RAM and 160MB internal hard drive; 2GB external APS hard drive; SuperMac 19-inch monitor; Microtek ZX300 scanner; Epson 128MB MO; 44MB and 200MB SyQuest drives; Wacom ArtPad tablet. **Software:** Adobe Photoshop 3.0. **m**



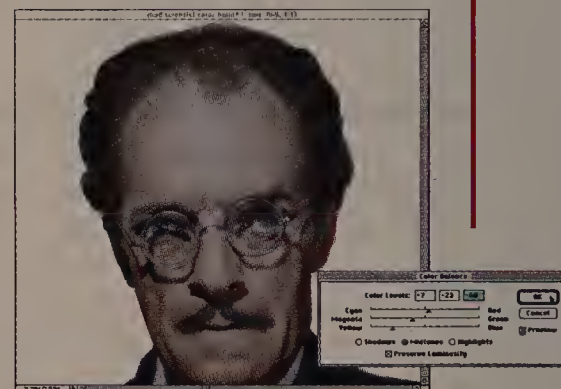
**1** Peters first selected the face with the lasso tool, which he prefers to the pen tool because it lets him work faster and provides more-precise control.



**2** To colorize the face, Peters used Color Balance, moving the yellow/blue slider toward yellow, the magenta/green toward magenta, and the cyan/red slider toward red. He then saved the face as a layer.



**3** After doing the initial colorizing in Color Balance, he fine-tuned the color with the Variations command, which not only offers more flexibility than Color Balance but lets him revert back to the original color if necessary.



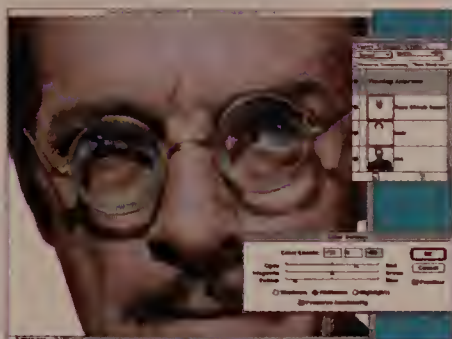
**4** To colorize the hair, he again used Color Balance, moving the sliders toward red, magenta, and yellow. He also used Variations to enhance the contrast between the hair and the skin, but because the mus-

tache looked too much like the hair and blended in too much with the skin, he adjusted the color balance again to make it a bluish-brown.

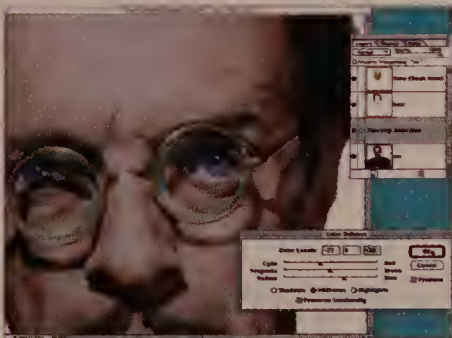




**5** He made the glasses a metallic gold by first selecting just the frames. Then, in Color Balance he moved the first slider toward red and the bottom slider nearly all the way to yellow, and left the middle slider on zero.



**6** The subject of the original photo had light eyes, so Peters made them blue, which also contrasted well with the glasses. He moved the Color Balance sliders toward cyan and blue. To make the lenses of the glasses stand out from the frames, eyes, and skin, he selected the lenses and moved the sliders toward cyan and blue-green.



**7** Peters first colored the jacket brown but then realized that this overemphasized the jacket; he wanted the focus to be on the face instead. Using Variations, he changed the jacket to a dark gray-blue, which made it blend in subtly with the surrounding elements.



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<b>BUSINESS</b>			22	Adam Software Inc.	37	192,193	Alliance Peripheral Systems	62	250,251	Optima Design	—
53	Kaetron Software	67	<b>STATISTICAL</b>			187	Bottom Line Distribution	63	170	Seybold Expos	—
IFC,1	Microsoft Corporation	—	28	SPSS INC.	85	194,195	ClubMac	96	210	Seybold San Francisco	—
18	Now Software	56	<b>UTILITIES</b>			16,17	Kingston Technology	201	<b>TRAINING</b>		
<b>CAD/CAM</b>			10	Aladdin Systems Inco	21	30,31	Mag Innovision	25	208	MacAcademy	106
20	Engineered Software	12	78	Casady & Greene	58	198	MegaHaus	245	96	Mactemps, Inc.	60
26	Graphsoft	46	80	Connectix - RAM Doubler	192	178	ProDirect	135	<b>ACCESSORIES</b>		
<b>CD ROM</b>			82	Connectix - Speed Doubler	193	21	Viking Components	233	<b>FURNITURE</b>		
98	Corel Corporation	78	50	Dantz Development	26	<b>INPUT DEVICES</b>			8	Anthro	—
253	Educorp	157	69	GDT Softworks	42	0BC	Kensington Microware Ltd.	1	<b>MISCELLANEOUS</b>		
<b>COMMUNICATION</b>			79	MicroMat	77	94	Sony Corporation	—	75	ALPS Electric (USA), Inc.	23
81	Claris	—	18	Now Software	56	13	Visioneer	—	77	ALPS Electric (USA), Inc.	43
83	Claris	—	84,85	Photodisc	—	<b>MICRO PROCESSOR</b>			<b>MAIL ORDER</b>		
101	Dataviz	79	<b>HARDWARE</b>			2,3	Power Computing Corporation	151	192,193	Alliance Peripheral Systems	62
32	Qualcomm	22	<b>BOARDS</b>			6,7	Power Computing Corporation	161	205	Big Mac Computers	101
<b>EDUCATIONAL</b>			133	Adaptec	—	86	Trinity Works	118	187	Bottom Line Distribution	63
22	Adam Software Inc.	37	14	Orange Micro	33	<b>MISCELLANEOUS</b>			194,195	ClubMac	96
<b>ENTERTAINMENT</b>			10	Reply Corporation	—	120,121	American Power Conversion	72	179-181	Computer Discount Warehouse	2
98	Corel Corporation	78	<b>CD ROM</b>			12	Big Island	24	186	DigiCore	269
<b>ENTERTAINMENT</b>			253	Educorp	157	88	Wacom Technology Corporation	146	182,183	Express Direct	81
<b>ENTERTAINMENT</b>			<b>COMPUTER SYSTEMS</b>			111	Xeikon	10	202,203	J&R Computerworld	282
<b>ENTERTAINMENT</b>			205	Big Mac Computers	101	<b>MULTIMEDIA</b>			204	L.A.Trade	—
<b>ENTERTAINMENT</b>			188,189	CRA Systems Inc.	20	112,113	Sony Electronics	—	199-201	LaCie	52
<b>ENTERTAINMENT</b>			182,183	Express Direct	81	<b>POWERBOOK</b>			196,197	Mac Bargains	70
<b>ENTERTAINMENT</b>			2,3	Power Computing Corporation	151	12	VST Power Systems	73	184	Mac Zone	71
<b>ENTERTAINMENT</b>			6,7	Power Computing Corporation	161	<b>PRINTERS</b>			185	Mac Zone	71
<b>ENTERTAINMENT</b>			147	Umax Computer	200	24,25	Epson America	—	176,177	MacConnection	145
<b>ENTERTAINMENT</b>			<b>DIGITIZERS/SCANNERS</b>			29	Xante Corporation	112	206,207	MacMall	131
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<b>ENTERTAINMENT</b>			47	Linotype-Hell	—	<b>SECURITY</b>			175	MacMarket	258
<b>ENTERTAINMENT</b>			49	Microtek Lab, inc.	105	120,121	American Power Conversion	72	190,191	MacWarehouse	150
<b>ENTERTAINMENT</b>			94	Sony Corporation	—	<b>VIDEO</b>			198	MegaHaus	245
<b>ENTERTAINMENT</b>			15	Umax Computer	—	84	Connectix - QuickCAM	191	178	ProDirect	135
<b>ENTERTAINMENT</b>			<b>DISPLAY</b>			<b>SERVICES</b>			<b>Web Watch</b>		
<b>ENTERTAINMENT</b>			188,189	CRA Systems Inc.	20	<b>ON LINE</b>			156	Agfa	—
<b>ENTERTAINMENT</b>			73	Hitachi NSA	74	100	EarthLink Network	8	156	Box Top Software	—
<b>ENTERTAINMENT</b>			IBC	NEC Technologies	16	74	Luckman Interactive	65	156	Desktop Laser & Ink Jet	—
<b>ENTERTAINMENT</b>			119	Polaroid	295	152	Netcom On-Line	54	156	Image Club Graphics	—
<b>ENTERTAINMENT</b>			65	ViewSonic	59	<b>DIRECTORY</b>			156	Impossible Software	—
<b>ENTERTAINMENT</b>			<b>EXPANSIONS/UPGRADES</b>			<b>ON LINE</b>			156	Max Computers	—
<b>ENTERTAINMENT</b>			204	L.A.Trade	—	<b>ON LINE</b>			156	NetJet	—
<b>ENTERTAINMENT</b>			86	Trinity Works	118	<b>ON LINE</b>			<b>DIRECTORY</b>		
<b>ENTERTAINMENT</b>			21	Viking Components	233	<b>ON LINE</b>			<b>DIRECTORY</b>		
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<b>ENTERTAINMENT</b>			86	Trinity Works	118	<b>ON LINE</b>					



Macworld puts you in touch with the information you need most with two easy options:

## 1 dial 503.684.5370 Fax In Card

Simply fill in the questionnaire, circle the reader service numbers that correspond to the vendors you would like information from, then fax your form to us at 503.684.5370. FREE product information will be sent to you directly from vendors.

## 2 postage pre-paid Mail In Card

After filling in the questionnaire, circle the reader service numbers that correspond to the vendors you would like information from, then just drop the postcard in the mail. Vendors will send FREE product information directly to you.

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THE ESSENTIAL RESOURCE

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PLEASE ANSWER THESE QUESTIONS, CHECK ALL ANSWERS THAT APPLY

1a. For which of the following Mac-related products do you specify, recommend, approve, purchase or influence the purchase?

1b. Which of the following do you plan to purchase in the next 12 months? (Check all that apply.)

Desktops/PowerBooks . . . . .	<input type="radio"/>	<input type="radio"/>
Monitors . . . . .	<input type="radio"/>	<input type="radio"/>
Printers . . . . .	<input type="radio"/>	<input type="radio"/>
Storage Devices . . . . .	<input type="radio"/>	<input type="radio"/>
Networking/Data Communications . . . . .	<input type="radio"/>	<input type="radio"/>
Internet/Intranet products/services . . . . .	<input type="radio"/>	<input type="radio"/>
Software: business/productivity . . . . .	<input type="radio"/>	<input type="radio"/>
graphics/design . . . . .	<input type="radio"/>	<input type="radio"/>
interactive publishing/		
multimedia . . . . .	<input type="radio"/>	<input type="radio"/>
entertainment . . . . .	<input type="radio"/>	<input type="radio"/>
education . . . . .	<input type="radio"/>	<input type="radio"/>
other software . . . . .	<input type="radio"/>	<input type="radio"/>
Any other products . . . . .	<input type="radio"/>	<input type="radio"/>

2. Are you employed, and involved in purchase decisions for 5 or more Macs? ☐ Yes ☐ No

3. What's Your Opinion?

What are your main frustrations in making Mac-related purchase decisions?

- ☐ Lack of expertise in assessing products
- ☐ Difficulty in installing or using products
- ☐ Too many choices
- ☐ Not enough choices
- ☐ Unclear needs
- ☐ Concern that cheaper, better products are about to come out
- ☐ Other (please specify) \_\_\_\_\_

### PRODUCT CATEGORY INFORMATION

For information on all of the products mentioned in an article or an entire category of advertised products, circle the appropriate number below.

- 951 Mail Order Companies
- 952 Printers
- 953 Scanner & Digital Cameras
- 954 Online/Internet
- 955 Storage Devices
- 956 Monitors & Graphics Boards
- 957 Utilities
- 958 Clip Art & Fonts
- 959 Memory
- 960 Draw/Paint/DTP Software
- 961 Image-Editing Software
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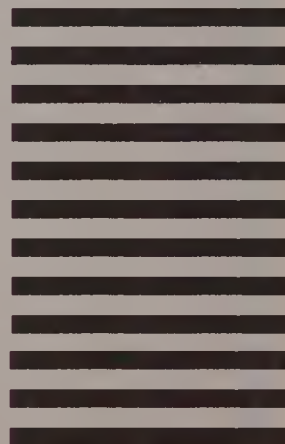
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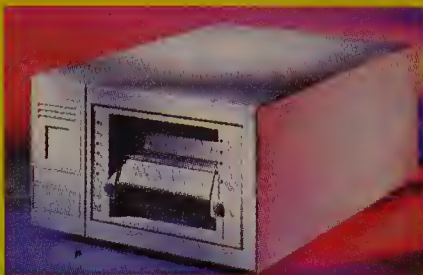
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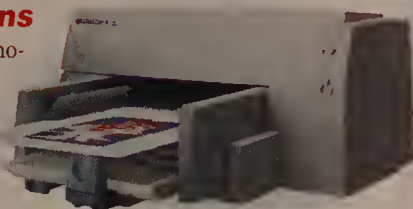
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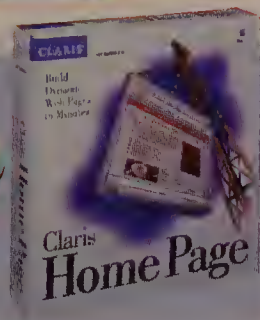
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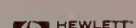
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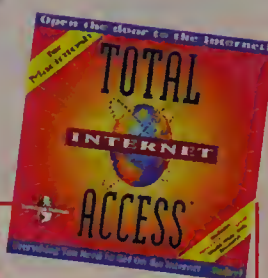
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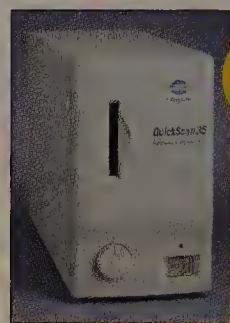
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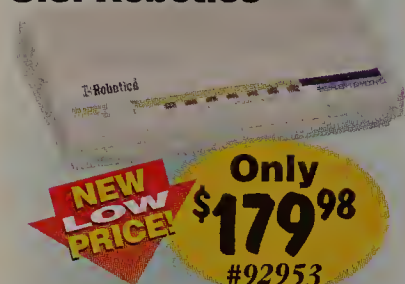


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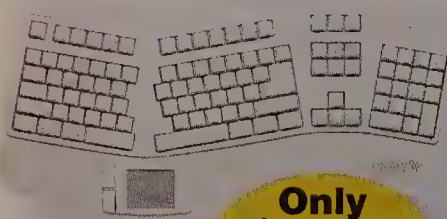


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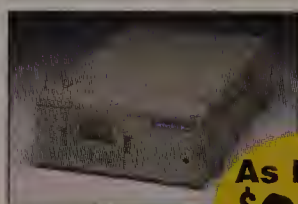
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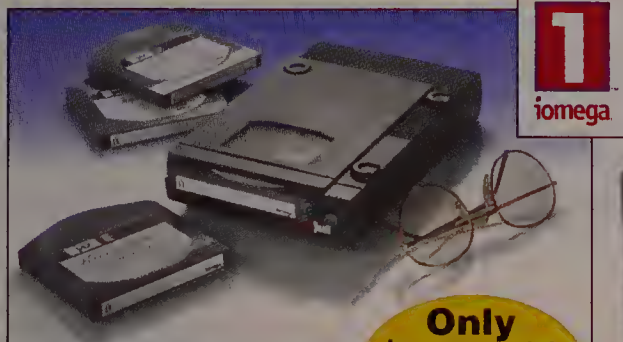
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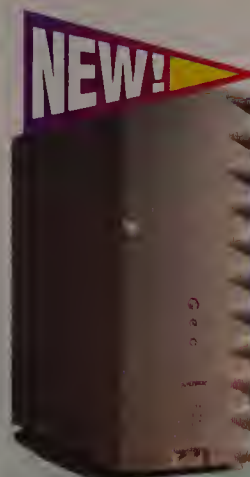
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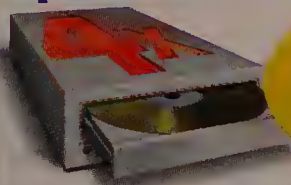
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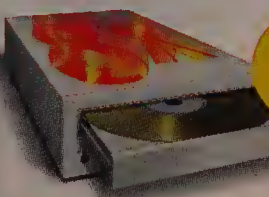
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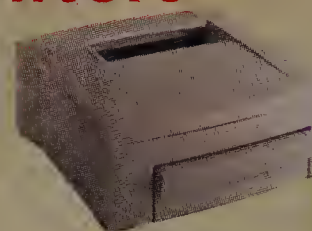


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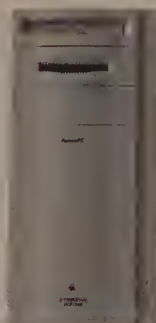
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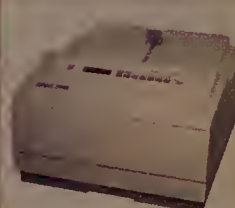
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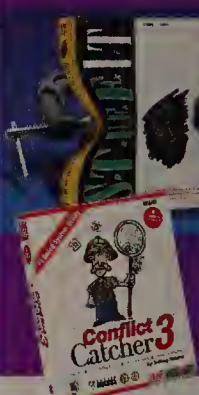
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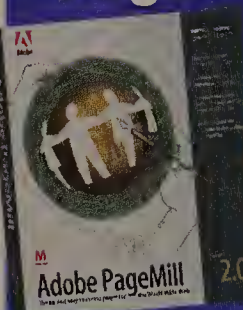
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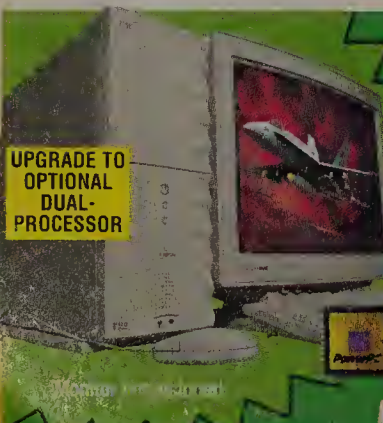
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MW1096



Circle 150 on reader service card

MACWORLD October 1991

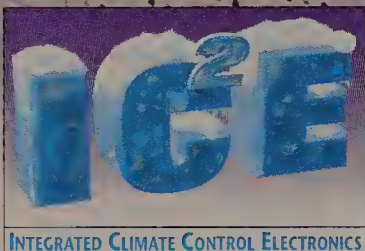


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# APS TECHNOLOGIES:

## WOW! 3GB FOR THE PRICE OF 2GB!

### GET 3GB HIGH PERFORMANCE STORAGE FOR THE PRICE OF MANY 2GB DRIVES!



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**GREAT PRICE**

**\$499<sup>95</sup>**

Internal configuration  
Quantum®

### APS Q 3200

- ✓ 3GB for the price of 2GB
- ✓ 4500 rpm mechanism – Ultra SCSI interface
- ✓ Transfers up to 3.06MB/sec.



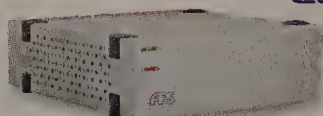
It's like getting an additional gigabyte for FREE. The new APS Q 3200 is priced lower than some 2GB SCSI drives, yet it delivers an 3000MB of reliable storage. The drive uses MR heads and an advanced PRML read channel to fit its 3GB into a 3.5" low profile Ultra SCSI drive.

### 2GB STORAGE FOR ONLY APS Q 2100

**\$399<sup>95</sup>**

Internal configuration  
Quantum®

- ✓ Reliable 4500 rpm Ultra SCSI mechanism
- ✓ MR heads and PRML read channel
- ✓ Exceptional value among 2GB drives
- ✓ 3-year warranty



Give your Mac the extra storage space it needs by adding the new APS Q 2100. At only 20¢ per MB for an internal configuration, the APS Q 2100 is the value leader among 2GB SCSI drives. Its transfer rates are a great match with most applications, and it's backed by a 3-year warranty.

### 1.2GB OF STORAGE FOR ONLY APS Q 1280

**\$249<sup>95</sup>**

Internal configuration  
Quantum®

- ✓ 4500 rpm mechanism
- ✓ High areal density and PRML read channel
- ✓ Ultra SCSI interface – Works in SCSI or Ultra SCSI environments
- ✓ 3-year warranty



Finally there's a hard drive that combines the reliability of a 4500 rpm mechanism with outstanding performance. The APS Q 1280 uses MR heads, PRML and Ultra SCSI technology for exceptional performance. It is backed by a 3-year warranty.

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- Turn your Power Mac or AV Quadra into a hands-free telephone workstation
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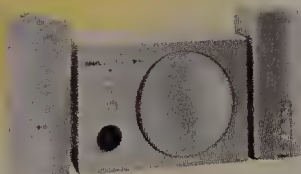


106185

**\$139<sup>95</sup>**

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- Magnetically shielded
- Includes a pair of YST-15 speakers and a thundering subwoofer



106359

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These products are performance-matched for optimal performance in the PowerPC environment.

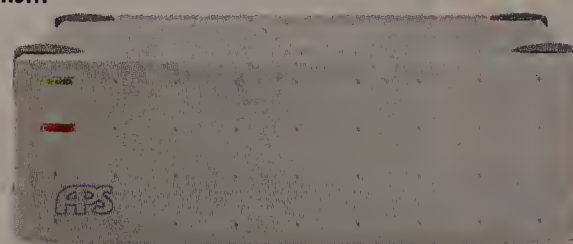
### INCREDIBLE! 7200 RPM PERFORMANCE, 5400 RPM PRICE!

### APS MS 2000

**\$449<sup>95</sup>**

Internal configuration  
MICROPOLIS

- ✓ 7.31MB/sec. sust. write, 4.54MB/sec. sust. read
- ✓ 5400 rpm mechanism
- ✓ 5-year warranty



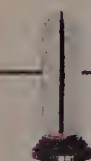
This incredible drive has the performance you might expect from a 7200 rpm mechanism but with a 5400 rpm price – and reliability! The APS MS 2000 formats to 2047MB, delivers sustained reads at up to 4.54MB/sec. and sustained writes at up to 7.31MB/sec, has an average access time of 20 ms and average seek of 9.6 ms.

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**JUST \$229<sup>95</sup>** Slimline enclosure  
SR 2000 \$299.95



**APS CD-8**

- ✓ High performance 8X CD-ROM drive
- ✓ Great for home and office CD-ROM use

The 8X performance of the new APS CD-8 supercharges any CD-ROM application! Its speed enhances multimedia AND business CDs. At this incredibly low price, you can hardly afford to live with that old 2x or 4x CD ROM drive.

## 540MB REMOVABLE MEDIA CAPACITY! APS M540

- ✓ 540MB capacity on removable media and full SyQuest 270 media compatibility
- ✓ Terrific performance — sustained reads up to 2.68MB/sec. and a 9.9ms average seek

Attention graphics professionals and desktop publishers: you now have a high-capacity, high-performance removable disk alternative. The new APS M540 provides 540MB of storage on reliable, single-platter media and is capable of transfer rates of up to 2.68MB/sec. The APS M540 is also read/write compatible with your existing SyQuest 270 cartridges.

## FABULOUS PRICE ON CD-R!

**APS CD-R \$599<sup>95</sup>** External configuration

- ✓ Uses CD media with 100-year shelf life
- ✓ Supports variable and fixed packet writing

A \$399 value — FREE

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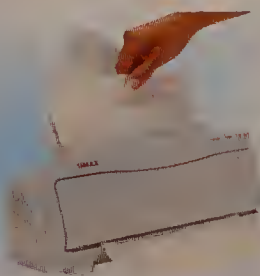
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1018-112 8mm 112 Cartridge	6.95	2.6GB MO	99.95
105039 8mm 160 Cartridge	14.95		
60M DAT	5.95	<b>SONY</b>	SALE PRICE
90M DAT	9.95	CD-R 74 Min	\$9.95
120M DAT	24.95	CD-R 74 Min 10pk	89.95

### UMAX PageOffice

- Document feeder holds up to 10 pages
- Fax, E-mail, edit, file or print scanned pages
- Includes OCR software and uses a SCSI interface

105304 **\$289<sup>95</sup>**



Call for information about our ultra-high capacity drives, professional backup and server products.

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- Drive-for-Drive Repair or Replacement Warranty. APS will, at its discretion, replace or repair products found to be defective according to the terms of the product's warranty.
- Refused orders subject to 20% restocking fee.
- Listed capacities are formatted.

- Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.
- Prices and specifications are subject to change without notice.
- You may need to install system software appropriate to your machine before using our hard drives.
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Circle 62 on reader service card

**APS**  
Technologies

### APS DESKTOP DRIVES

Model	Capacity/Awards	Internal	SR2000
APS Q 1280	1222MB <small>MacWEEK LABS</small>		\$249 <sup>95</sup> \$349 <sup>95</sup>
Quantum Fireball TM			
APS Q 2100	2100MB		399 <sup>95</sup> 499 <sup>95</sup>
Quantum Fireball TM			
APS Q 3200	3200MB <small>MacWEEK LABS</small>		499 <sup>95</sup> 599 <sup>95</sup>
Quantum Fireball TM			

### APS HIGH-PERFORMANCE DRIVES

Model	Capacity/Awards	Internal	SR2000
APS I 2160	2063MB <small>Now ULTRA SCSI</small>		\$449 <sup>95</sup> \$549 <sup>95</sup>
IBM Ultrastar ES			
APS MS 2000	2000MB <small>MacWEEK LABS</small>		449 <sup>95</sup> 549 <sup>95</sup>
Micropolis 4421			
AV available for an additional \$100.00			
APS Q 4.0	4101MB <small>MacWEEK LABS</small>		899 <sup>95</sup> 999 <sup>95</sup>
Quantum Atlas XP3430			
APS MS 4.0	4101MB <small>MacWEEK LABS</small>		899 <sup>95</sup> 999 <sup>95</sup>
Micropolis 3243			
APS MS 9000	8669MB		1899 <sup>95</sup> 1999 <sup>95</sup>
Micropolis 3391			
Fast/Wide available for an additional \$100.00			

### POWERBOOK DRIVES

Model	Capacity/Features	Drive Type	Internal
APS Q 1.08	1037MB		
Quantum Europa	3800 rpm	Fast ATA2	\$399 <sup>95</sup>
APS I 1.2	1200MB		
IBM Travelstar DPRS-21215	4900 rpm	SCSI-2	699 <sup>95</sup>

### APS QIC & DAT BACKUP SYSTEMS

Model	Capacity/Awards	Internal	SR2000
APS HyperQIC™	8GB <small>MacWEEK LABS</small>		\$499 <sup>95</sup>
Travan 4 Conner QIC 3095 Mech.		N/A	
APS HyperDAT®	8GB <small>MacWEEK LABS</small>		\$849 <sup>95</sup> 899 <sup>95</sup>
DDS-2 Compression Mech.			
APS HyperDAT® Pro 8GB			949 <sup>95</sup> 999 <sup>95</sup>
DDS-2 High Speed Mech.			

### APS REMOVABLE DRIVES

Model	Capacity/Awards	SR 1000	SR 2000
APS SQ 5200	194MB <small>MacWEEK LABS</small>		\$399 <sup>95</sup>
APS M540	500MB		299 <sup>95</sup>
APS Jaz	1GB		\$499 <sup>95</sup> 499 <sup>95</sup>

### APS CD-ROM DRIVES

Model	Internal	SR2000
APS CD-8 8X CD-ROM	N/A	\$229 <sup>95</sup>
APS CD-8 Pro 8X CD-ROM	N/A	299 <sup>95</sup>
APS PD4 4X CD-ROM/Optical	N/A	499 <sup>95</sup>
APS CD-R Recordable CD-ROM	N/A	599 <sup>95</sup>
APS CD-R Plus 2X/4X CD-R	N/A	899 <sup>95</sup>

### APS MO DRIVES

Model	Capacity/Features	Awards	SR2000
APS 230MB MO	Up to 217MB <small>MacWEEK LABS</small>		\$399 <sup>95</sup>
APS 2.6GB MO	4MB cache		1799 <sup>95</sup>



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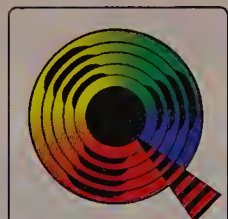
## ClubMac 3.5" 270MB Removable



**\$169**

C104 1802

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REMOVABLE  
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**EZ Drive**

S198 2001

**\$119<sup>95</sup>**



**135MB**

**FREE CARTRIDGE**

S198 2001 EZ 135MB Drive with cartridge

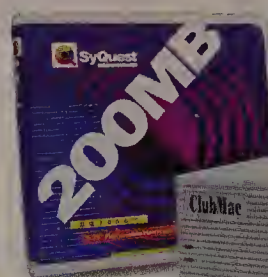
**\$119<sup>95</sup>**

C104 1802 3.5" ClubMac 270MB Cartridge not included **\$169**

### GENUINE SYQUEST CARTRIDGES

Part Number	Media	Qty 1	Qty 10	Qty 20	Part Number	Media	Qty 1	Qty 10	Qty 20
S198 1013	105MB	\$35ea	\$34ea	\$33ea	S198 1010	44MB	\$40ea	\$39ea	\$38ea
S198 1014	270MB	\$57ea	\$56ea	\$55ea	S198 1011	88MB	\$44ea	\$43ea	\$42ea
S198 2001	135MB	\$24 <sup>95</sup> ea	\$23 <sup>95</sup> ea	\$23ea	S198 1012	200MB	\$69ea	\$68ea	\$67ea

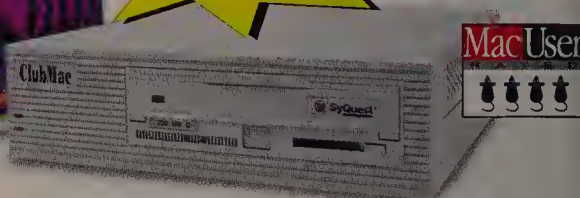
Mac OS COMPATIBLE



C104 1801

**\$389**

**200MB**



C104 1801 5.25" ClubMac 200MB Cartridge not included **\$389**

All ClubMac SyQuest drives include Chiasmus Anubis formatting software, necessary cables for "plug-and-play" and documentation. All ClubMac SyQuest drives include a 30-Day Money Back Guarantee and Two Year Warranty.

# CLUBMAC HARD DRIVE STORAGE



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**7200 RPM • 1024K CACHE**

**4.3GB**

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Internal Atlas C104 0005

# Quantum

Capacity	Model	Access	Part No.	Internal	Part No.	External
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2150MB	Tempest	10.5ms	C104 0013	\$429	C104 0063	\$489
3255MB	Tempest	10.5ms	C104 0014	\$529	C104 0064	\$589
4300MB	Atlas 8.6ms		C104 0005	\$899	C104 0055	\$959

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- 4500 RPM
- 128K Buffer
- 12ms Access

540MB	Internal	Price	External	Price
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# CLUBMAC CD-ROM DRIVES

**CLUBMAC**  
**4.4X-SPEED**  
**CD-ROM**

**\$149**

**4.4X**

C104 1700

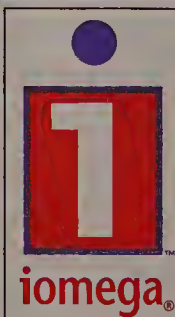


C104 1700	ClubMac 4.4X CD-ROM Drive	\$149
C104 1750	ClubMac 8X CD-ROM Drive	\$269
N024 1070	NEC MultiSpin 4Xc 7 Disc Changer	\$339

# REMOVABLE STORAGE

**iomega Jaz Drive**

**1.0GB**



**\$499<sup>95</sup>**

iomega Jaz Cartridges	Includes One 1.0GB Cartridge!
1040 1015 Jaz Cartridges (168 Single)	\$119 <sup>95</sup>
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# CLUBMAC TAPE BACKUP

**CLUBMAC TAPE BACKUP DRIVES**

C104 0901

**\$439**

**4-8GB**

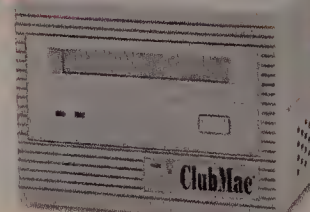
TWO Year Warranty



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C104 0901	4-8 GB MiniSCSI w/o cartridge	\$439
C104 1300	2 GB ThunderDAT	\$749
C104 1301	4-8 GB CompressionDAT	\$879
C104 1302	4-8 GB PerformanceDAT	\$1079



**iomega Zip Drive**

**100MB**



Includes One 100MB Cartridge!



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**- \$50<sup>00</sup> \***

**\$149<sup>95</sup>**

iomega Zip Cartridges	
1040 1006 Zip Cartridges (100MB)	\$19 <sup>95</sup>
1040 1011 Zip Cartridges (3 pack)	\$49 <sup>95</sup>
1040 1010 Zip Cartridges (10 pack)	\$149 <sup>95</sup> - \$20 Rebate = <b>\$129<sup>95</sup></b>

7 Hammond, Irvine CA 92718

**NO SURCHARGE!**



- ClubMac hard drives include all cables, cords, leads, and brackets necessary for use with the Macintosh you specify. ClubMac formats all hard drives and installs Apple System 7.1 software, Chiasmus Anubis, and PowerMerge LE.
- External drives include a Double Shielded, twisted pair 25-50 SCSI cable.
- ClubMac honors all original equipment manufacturers warranties. ClubMac will repair or replace drives at its discretion. Drives returned within first 30 days of purchase are replaced with a new unit.
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- Resolution up to 1600 x 1200
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Radius PrecisionView 21 Display System (R016 1032) ..... \$2399



### 15" Technitron DX15T

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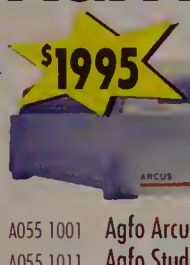
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## AGFA



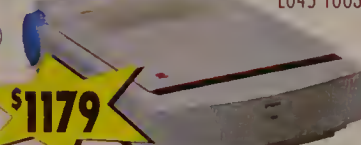
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- Single pass, High speed scanner
- 600 x 1200 dpi resolution
- 36-bit color scanning
- Transparency Module
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E045 1007 ES1200C LE-MAC Color Scanner w/Scanomatic ..... \$949  
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## Vista S6LE



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150MHz PowerPC



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MACWORLD October 1996

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Circle 96 on reader service card



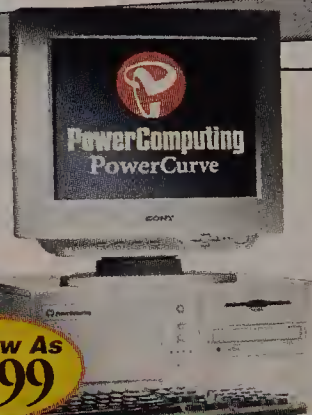
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- 13.5ms average seek time; 2.4MB/sec. sustained data transfer rate
- One-year warranty on drive; limited lifetime warranty on cartridges
- For more information, e-mail keyword EZFLYER

SyQuest #34704



**Epson 1200 C Pro Scanner**

- 4800x4800 dpi max. resolution (interpolated)
- One- and three-pass scanning for flexibility
- Simultaneously connects to a Macintosh and IBM compatible PC
- For more information, e-mail keyword EPSON1200C

Epson #02110

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## SUPER DEALS ON HOT PRODUCTS

**MICROPOLIS** We are the #1 source for Micropolis Drives! Ask about our low price guarantee.

### 2 Gig

SCSI \$395 SCSI A/V \$449

#MC4421, 5400RPM, 9ms access, 5 year warranty

<b>2 Gig</b>	<b>7200RPM</b>	<b>\$545</b>
	AV	\$605
	Wide	\$630
	Wide A/V	\$690
<b>4 Gig</b>	<b>7200RPM</b>	<b>\$785</b>
	AV	\$869
	Wide	\$869
	Wide A/V	\$959
<b>9 Gig</b>	<b>5400RPM</b>	<b>\$1575</b>
	AV	\$1689
	Wide	\$1659
	Wide A/V	\$1779
<b>9 Gig</b>	<b>7200RPM</b>	<b>\$1799</b>
<b>NEW 3 1/2"</b>	<b>Wide</b>	<b>\$1829</b>

### Quantum™

<b>1 Gig</b>	<b>7200RPM</b>	<b>\$299</b>
	Wide	\$299
<b>2 Gig</b>	<b>7200RPM</b>	<b>\$639</b>
	Wide	\$649
<b>4 Gig</b>	<b>7200RPM</b>	<b>\$889</b>
	Wide	\$919

### • CD Recorder •

<b>2X Write</b>	<b>4X Read</b>	<b>\$575</b>
<b>4X Write</b>	<b>4X Read</b>	<b>\$999</b>

Includes Toast CD Mastering Software

### • 8X CD ROM •

## \$229

### • 2.6 Gig Optical •

## \$1569

2.6 Gig disks 1-4\$70 5-9\$65 10+\$60

### • 4 Gig Tape •

## \$439

Includes backup software, 1 tape

### • 4-8 Gig DAT •

## \$949

Includes backup software

\*\*\* Macworld Magazine 8/96



Drives include 1 FREE cartridge.

<b>100MB Zip</b>	<b>\$195</b>
<b>1Gig Jaz internal</b>	<b>\$379</b>
<b>1Gig Jaz external</b>	<b>\$439</b>
<b>1Gig Jaz external (iomega case)</b>	<b>\$469</b>
<b>100MB Zip disks 2-4 \$20 5-9 \$17 10+ \$15</b>	
<b>1Gig Jaz disks 2-4 \$99 5-9 \$95 10+ \$90</b>	

### Turn a Hard Drive Into a Removable



Converts any 3 1/2" hard drive into a removable drive. Great for transportability, data interchange, or security needs. Extremely

high quality construction. Metal cartridge and frame, cooling fan. Unit has SCSI ID select on the cartridge. Qty discounts available.

	System	Extra Cartridge	Extra Frame
SCSI	\$85	\$40	\$54
WIDE SCSI	\$129	\$64	\$75

Weather resistant case to store and transport cartridge \$55

### • CD ROM DRIVES •

All CD Drives include external drive, cable, & driver software.

NEC	4X	200ms	\$199
Pioneer	4.4X	140ms	\$219
Teac	6X	160ms	\$339
Plextor	6X	145ms	\$379
Philips	8X	195ms	\$329
NEC	8X	145ms	\$359
Toshiba	8X	145ms	\$369
Plextor	8X	115ms	\$489

### Special Bundle Offer!

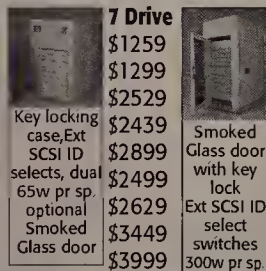
Buy any CD Drive and any Hard drive at the same time and take \$10 off the total price!

### CD ROM CHANGERS

Pioneer	4.4X	DRM-624X	6 Disk	190ms	\$299
Pioneer	4X	DRM-1804X	18Disk	300ms	\$1899

### CD ROM TOWERS 4 Drive

NEC	4X	\$759
Pioneer	4.4X	\$799
Plextor	4.5X	\$1499
Teac	6X	\$1439
Plextor	6X	\$1699
Philips	8X	\$1459
NEC	8X	\$1559
Toshiba	8X	\$1999
Plextor	8X	\$2299



### • OPTICAL DRIVES •

All prices below include external drive, cable, driver software, and 1 FREE cartridge.

230MB	Fujitsu	\$479
640MB	Fujitsu (230MB backwards compatible)	\$649
650MB	PD ROM combination optical & 4XCD	\$509
2.6Gig	Pinnacle Micro	\$1579
2.6Gig	Maxoptix	\$1699
2.6Gig	Hewlett Packard	\$2219

### • REMOVABLES •

New 540MB MCD drive is backwards compatible with SyQuest 270MB media.

**540MB \$295 \$355 external**



**SyQuest**

SyQuest drives include 1 FREE cartridge.

135MB external	\$139	200MB int/ext	\$399/\$459
230MB external	\$289	270MB int/ext	\$179/\$239

### • SCSI CONTROLLERS •

Save \$10 when you purchase any SCSI controller with any SCSI drive.

<b>ADAPTEC</b>		
A2940MUW PCI, supports Ultra Wide SCSI		\$299
<b>ATTO</b>		
NuBus, Bus Mastering, 15 Wide SCSI devices		\$799
PCI, Bus Mastering, 15 Wide SCSI devices		\$319
PCI, Bus Mastering, Twin Channel, 30 Wide SCSI devices		\$829

### • RAID SOLUTIONS •

Remus RAID software by Trillium Research	
Remus RAID 0 or 1 software	\$229
Remus Lite RAID 0, 1, 4, or 5 software	\$349

MegaHaus stocks a wide variety of RAID solutions from top manufacturers; Adaptec, DPT, Raidtec, Stream Logic (formerly Micropolis Radion), Remus, and Tekram. Call for a quote. We custom build RAID systems - including hot swappable solutions.

### • SCSI HARD DRIVES •

SCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31055N	3	\$339	\$399
1080MB	11ms	5400	Seagate	ST51080N	3	\$249	\$309
2147MB	9ms	5400	Seagate	ST32155N	5	\$509	\$569
2147MB	8ms	7200	Seagate	ST32550N	5	\$729	\$789
4290MB	8ms	7200	Seagate	ST15150N	5	\$989	\$1049
9080MB	11ms	5400	Seagate	ST410800N	5	\$1880	\$1980

### • IDE HARD DRIVES •

IDE	Speed	RPM	Brand	Model	Wty	Price
1080MB	11ms	4500	Fujitsu	M1614T	3	\$165
1280MB	12ms	5400	Quantum	FB1280A	3	\$215
1700MB	11ms	4500	Quantum	SR31700A	3	\$229
2167MB	10ms	5400	Seagate	ST32140A	3	\$275
2500MB	11ms	4500	Quantum	SR32550A	3	\$325
3254MB	10ms	4500	Quantum	TM33200A	3	\$369

### 2 1/2"

540MB	13ms	4200	Toshiba	MK1924FC	1	\$229
810MB	13ms	4200	Toshiba	MK1926FC	1	\$329
1350MB	13ms	4200	Toshiba	MK2720FC	1	\$519
2100MB	13ms	4200	Toshiba	MK2101MAN1	1	\$699

### • SCSI TAPE DRIVES •

All Tape Drives include external drive, cable, NovaMac software, & 1 FREE tape.

2Gig	Seagate	QIC	\$425
2Gig	HP	DAT	\$719
2Gig	Seagate	DAT	\$709
2-4Gig	HP	DAT	\$799
2-4Gig	Seagate	DAT	\$789
4Gig	Seagate	QIC	\$509
4-8Gig	Seagate	DAT	\$969
4-8Gig	HP	DAT	\$979
7-14Gig	Exabyte	8mm	\$1199
15-30Gig	Quantum	DLT	\$2659

**Desk tape \$289**  
Allows you to mount most tape drives as a normal drive on the desktop.

### • MAC ENCLOSURES •

HH = 5 1/4" half height, 3 1/2" drives can be mounted in a HH bay with an adapter bracket.

FH = 5 1/4" full height. Open = Open face for tape etc.

part #	drive capacity	power, fans	"high, wide, deep	
3.5CASE	1 3.5"	20W, 1	5.5x3.5x8	\$99
HHCASE	1 HH	40W, 1	2.3x9.7x10.4	\$79
CD CASE	1 HH CD	40W, 1	2.3x9.7x10.4	\$89
FHCASE	1 FH or 2HH	65W, 1	4x10x10.5	\$139
DUALCASE	2 FH or 4HH	2x65W, 2	11.9x7.5x12	\$250
TOWERCASE	3 FH or 7HH	300W, 2	19x9x13	\$439
QUADCASE	4 FH or 8HH	4x65W, 3	17.4x8.4x11.7	\$539

GS-2002 holds 5 FH or 8HH or 12 HH CD, has hot swappable redundant 300W power supplies, 2 cooling fans with stop alert \$749

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Oct 1996 MacWorld



**AWARD-WINNING COLOR**

# SILVERSCANNERS

**LACIE**  
LIMITED

## Compare these features:

- Color previews in seconds.
- Scans in under a minute.
- The industry's leading scanning software.

"ScanPrep is an essential application if you own a scanner... the sort of program that has to be seen to be believed." **Ben Long - MacWeek**

Highest Possible Rating



"No matter what acquired plug-in you get if you use Photoshop, you'll also want to buy a copy of ScanPrep." **- MacUser**

Highest Possible Rating



### SilverScanner PRO

24 bit color, 300 x 600 dpi  
interpolated to 1200 dpi.

- ▲ SilverScan
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

**\$499**

### SilverScanner PRO with Photoshop LE

24 bit color, 300 x 600 dpi  
interpolated up to 1200 dpi.

- ▲ Photoshop LE
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

**\$599**

### SilverScanner DTP

30 bit color, 400 x 800 dpi  
interpolated to 3200 dpi.

- ▲ SilverScan
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

**\$799**



### SilverScanner DTP with Photoshop LE

30 bit color, 400 x 800 dpi  
interpolated up to 3200 dpi.

- ▲ Photoshop LE
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

**\$889**

### SilverScanner III

30 bit color, 600 x 1200 dpi  
interpolated up to 4800 dpi.

- ▲ SilverScan
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

**\$1499**



### SilverScanner III with Photoshop Full

30 bit color, 600 x 1200 dpi  
interpolated up to 4800 dpi.

- ▲ Photoshop (Full Edition)
- ▲ ScanPrep
- ▲ Omnipage Lite OCR

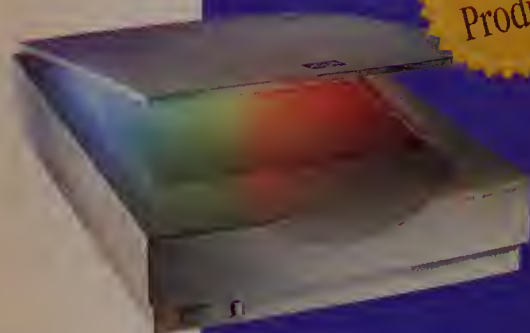
**\$1659**

### Sheet Feeder Adapter (DTP and III)

**\$499**

### Transparency Adapter (DTP and III)

**\$799**



**NEW**  
Product



**1 Year**  
Scanner  
Warranty



**30 Day**  
Money Back  
Guarantee



**FREE** with all La Cie scanners, ScanPrep automates Photoshop's\* image processing tools, individually preparing each image for printing right before your eyes. Simply describe the project to ScanPrep and scan the base image. ScanPrep yields professional prepress results, quickly and easily.

**ScanPrep**  
Smart Agent  
Image Processor

**INPUT**

Source: La Cie SilverScanner III

Original: Color Photo

Appearance: Normal

Condition: Normal

Input Width: 6.25

Input Height: 5

Output Width: 6.25

Output Height: 5

Scale: 100 %

Current Settings: - Untitled -

Load... Save... Cancel OK

**OUTPUT**

Desired Result: Full Range Separation

Printing Process: Brochure (Sheet Fed)

Paper Stock: Coated

Range/Gain: 3/95/4

Screen Preference: 150

ScanPrep provides automatic adjustment of picture contrast and color saturation. Even when the original is lacking in contrast or saturation, it corrects the problem without human intervention.

\*Full version only.

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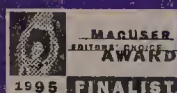


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offers a  
**world of storage solutions**



All La Cie drives with this Storage Utilities mark include acclaimed Silverlining Disk management software plus four other vital performance enhancements, a \$99 value... **FREE!**



## internal hard drives



▲ High-performance drive and controller technology.

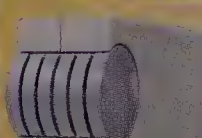
**\$389**  
2.1 GB

### 3.5" Drives

1280MB Quantum Fireball	3 yr. warr.	<b>\$244</b>
2160MB Ultrastar ES	5 yr. warr.	<b>\$389</b>
2.1GB Quantum Fireball TM	5 yr. warr.	<b>\$389</b>
3.2GB Quantum Fireball TM	5 yr. warr.	<b>\$489</b>
4.3GB Quantum Atlas	3 yr. warr.	<b>\$838</b>

Brackets available for \$10 with internal hard drive purchase.  
\*While supplies last.

## external hard drives



### TSUNAMI

▲ Ready to plug and play with switchable active termination, cables, and La Cie Storage Utilities.



**\$327**  
Quantum 1280 MB

### Tsunami External Drives

1280MB Quantum Fireball	3 yr. warr.	<b>\$319</b>
2160MB Ultrastar ES	5 yr. warr.	<b>\$479</b>
2.1GB Quantum Fireball TM	5 yr. warr.	<b>\$479</b>
3.2GB Quantum Fireball TM	5 yr. warr.	<b>\$579</b>
4.3GB Quantum Atlas	3 yr. warr.	<b>\$919</b>

\*While supplies last.

## Apple external hard drives

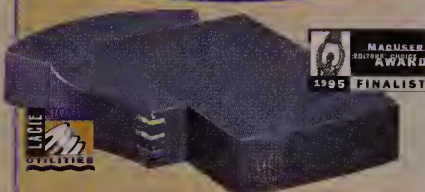


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The only hard drive backed with Apple engineering. For a local reseller or catalog resource call 1-800-999-0499.

## portable Joule drives



▲ Docking provides new security and backup solutions.

▲ Share hard disk-sized files with diskette convenience.

▲ Unplug and go for convenient data transport.

### Joule 3.5" Drives with Dock

1280MB Quantum Atlas	3 yr. warr.	<b>\$399</b>
2.1GB Quantum Fireball TM	3 yr. warr.	<b>\$659</b>
3.2GB Quantum Fireball TM	3 yr. warr.	<b>\$759</b>

## tower Joule drives



### 3.5" Drives with Mount

For use in Tower with a Joule Base.

1280MB Quantum Atlas	3 yr. warr.	<b>\$399</b>
2.1GB Quantum Fireball TM	3 yr. warr.	<b>\$659</b>
3.2GB Quantum Fireball TM	3 yr. warr.	<b>\$759</b>
4.3GB Quantum Atlas	5 yr. warr.	<b>\$1099</b>

### Joule Bases - Supports Stacks Up To 6 Drives High

2.1GB Quantum Fireball TM	3 yr. warr.	<b>\$689</b>
3.2GB Quantum Fireball TM	3 yr. warr.	<b>\$789</b>

## raid Joule drives



▲ Ideal for high performance applications like multi-media and animation.

▲ User can easily configure RAID level 0, 1, 4, or 5.

### Joule RAID

Quantum drives bundled with Trillium Research Software configurable to levels 0, 1, 4 & 5.

	RAID Drives only	RAID with SCSI card
4.2GB	<b>\$1999</b>	<b>\$2299</b>
8.4GB	<b>\$3499</b>	<b>\$3799</b>
16.8GB	<b>\$6999</b>	<b>\$7299</b>
25.8GB	<b>\$9999</b>	<b>\$10299</b>

# LACIE Speed<sup>d2</sup>™

## Technology For The Future

Device N

Device N

N=1,2,3...126  
Devices are Macs or SSA drives.

Device N

Device N

Device N

Device N

Device N

Device N

Device N

- Point to point loop offering multiple data paths.
- Eliminates SCSI's performance bottlenecks.
- Provides fail safe solution if one side of loop should fail.
- Up to 25 meters between devices, using inexpensive four-wire cables and connectors.
- Allows simple diagnosis - replace defective devices without interruption.

- Dedicated to graphics, audio, video, prepress and multimedia workgroups.
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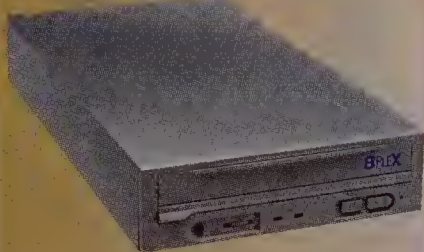
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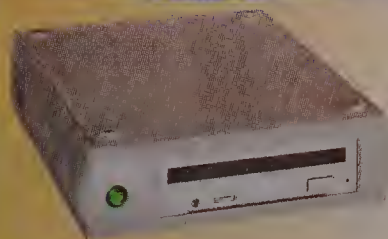
## cd-rom8x drives



- ▲ Fastest access speed available.
- ▲ Transfer rates up to 1200 kb/sec.
- ▲ Smooth audio and video playback.

**\$199**  
8X CD-Rom

## cd-r drives

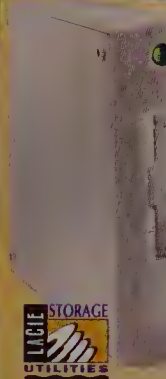


- ▲ Low cost media for backup.
- ▲ CD-Rs ship with Gear Multimedia software.
- ▲ Create your own CD with fast write capability.

**\$1299**  
4X CD Recorder

4X Recorder with Gear MultiMedia **\$1299**  
650 CD-R Disk 74 Minutes 10 Disk Pack **\$89**

## optical drives

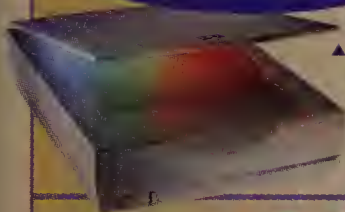


- ▲ Optical is the new standard in removable reliability.
- ▲ Available in two popular capacities.
- ▲ Compact storage convenience.

**\$599**  
640MB Optical

Powerbook Internal External  
230MB 1 yr. warr. **\$399** **\$389** **\$399**  
640MB External 1 yr. warr. **\$599**  
2.6GB External 1 yr. warr. **\$1799**

## silverscanner pro



- ▲ 24 bit color, 300 x 600 dpi interpolated to 1200 dpi.

**Package 1 \$499**  
Includes: Silverscan, ScanPrep, OmniPage Lite OCR

**Package 2 \$599**  
Includes: Photoshop LE, Silverscan, ScanPrep, OmniPage Lite OCR

## syquest drives



- ▲ 13.5msec access time doubles ZIP's speed.
- ▲ EZ offers the lowest per-megabyte media cost on the market.
- ▲ The removable media value leader.
- ▲ Full 2 year warranty.

**\$109**  
EZ135

SyQuest  
EZ135MB Inc. coupon for 2nd FREE cartridge **\$109**  
EZFlyer 230MB Drive only **\$299**

## jaz with 3 cartridges



- ▲ 1 GB of data on sturdy and compact 3.5-inch disks.
- ▲ Power supply included in the exclusive La Cie metal case.
- ▲ Includes 3 cartridges!

♦♦♦♦♦  
MacWeek

**\$599**

JAZ 1GB w/3 Cartridges  
3 cartridges FREE! (\$357 value)

## dat drives



- ▲ The ideal medium for data backup.
- ▲ The cheapest backup solution per megabyte.

**\$899**  
8.0GB DAT DDS-2

DAT Drives Includes Retrospect  
8.0GB DAT DDS-2 External **\$899**  
8.0GB TURBO DAT DDS-2 External **\$999**

## dlt drives

- ▲ Transfer rates from 150 to 180 MB per minute.
- ▲ Flexible cache buffer automatically adjusts to slower host data transfer rates.

Maximum Storage Capacity  
Ideal for network servers and high-end work stations

**\$2999**  
30.0GB DLT External

DLT Drives Includes Retrospect  
30.0GB Quantum DLT External **\$2999**  
40.0GB Quantum DLT External **\$4999**

## cartridges

	Qty. 1	Qty. 10
Omega Jaz 1GB	<b>\$119</b> ea.	<b>\$99</b> ea.
Syquest S0400 440MB	<b>\$38</b> ea.	<b>\$37</b> ea.
Syquest S0400 880MB	<b>\$42</b> ea.	<b>\$41</b> ea.
Syquest S0200 200MB	<b>\$62</b> ea.	<b>\$61</b> ea.
Syquest S0105 105MB	<b>\$53</b> ea.	<b>\$52</b> ea.
Syquest EZ135 135MB	<b>\$18</b> ea.	<b>\$17</b> ea.
Syquest EZFlyer 230MB	<b>\$30</b> ea.	<b>\$29</b> ea.
Syquest S0370 370MB	<b>\$48</b> ea.	<b>\$47</b> ea.
Optical 128MB	<b>\$16</b> ea.	<b>\$15</b> ea.
Optical 256MB	<b>\$21</b> ea.	<b>\$20</b> ea.
Optical 640MB	<b>\$48</b> ea.	<b>\$48</b> ea.
Optical 1.1GB	<b>\$59</b> ea.	<b>\$58</b> ea.
Optical 2.6GB	<b>\$85</b> ea.	<b>\$84</b> ea.
CD-R 74 630MB	<b>\$8</b> ea.	<b>\$8</b> ea.
DAT 230	<b>\$9</b> ea.	<b>\$8</b> ea.
DAT 120	<b>\$25</b> ea.	<b>\$24</b> ea.
DAT Omega Xii	<b>\$9</b> ea.	<b>\$8</b> ea.
DLT 30 30GB	<b>\$40</b> ea.	<b>\$39</b> ea.
DLT 40 40GB	<b>\$98</b> ea.	<b>\$97</b> ea.

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Rebate expires 9/15/96

### Iomega Zip™ 100MB Drive for Mac/PC

• Unlimited storage on inexpensive 100MB disks • For Macs and PCs that have a SCSI interface

**\$199<sup>95</sup> reg. price**  
**-50<sup>00</sup> mail-in rebate**  
**\$149<sup>95</sup> final price**  
(BER ZIP100SCSI)

### Spare Zip Disks: 10-Pack

**\$149<sup>95</sup> reg. price**  
**-20<sup>00</sup> mail-in rebate**  
**\$129<sup>95</sup> final price**  
(BER MAC100MBTN)

### Zip™ 100MB External PC Drive

• Plug & play setup to parallel port connection

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**-50<sup>00</sup> mail-in rebate**  
**\$149<sup>95</sup> final price**  
(BER ZIP100PAR)

### Spare Zip Disks: 10-Pack

**\$149<sup>95</sup> reg. price**  
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(BER ZIP100TENPK)

## NEW LOWER PRICES!

### Iomega External Jaz™ Drive

• Jaz cartridges are available in either 540MB or 1-gigabyte capacity • Fast 6.73MB per second maximum sustained transfer • 17.5 ms average access time • Portable (so small it fits in your hand), it weighs only 2 pounds • Easy to set up and operate • For SCSI interfaces • Comes with one 1-gigabyte cartridge • For Mac or PC

**\$499<sup>95</sup>**  
(BER JAZEXTSCSI)

### Spare Jaz 1-GIG Disk 5-Pack (PC)

(BER JAZ1GIG5PAK) ..... **\$499.95**

### Spare PC Jaz 1-GIG Disk (PC)

(BER JAZ1GIGCART) ..... **\$124.95**

### Spare Jaz 1-GIG Disk (Mac) 5-Pack

(BER MAC1GIG5PAK) ..... **\$499.95**

### Spare Jaz 1-GIG Disk (Mac) ...

(BER MAC1GIGCART) ..... **\$124.95**

## CD-ROM Players

**Philips 8X CD-ROM Player**  
• 1.2MB per second transfer rate • 195ms average access rate • 256K data buffer • Power save after 5 min. • Caddyless, matarized disc loading tray • 2 year warranty  
**\$299<sup>95</sup>**  
(PHI PCA80SC40)

**Sony External 4X CD-ROM**  
(SON CSD7611M) ..... **\$289.95**

**Micranet External 4X CD-ROM Kit**  
(MNT ADVMM4X) ..... **\$389.95**

**Panasonic Portable 4X CD-ROM**  
(PAN KXLD742) ..... **\$399.95**

## Recordable CD-ROM

**Philips CDD2000 2X Write/4X Read CD-ROM**  
• External read/write CD-ROM player • Up to 780MB capacity • 706KB/sec. read • 353KB/sec. read/write • Comes with Carel CD Creator, cable, 2 blank CD-R discs  
**\$849<sup>95</sup>**  
(PHI CDD2010/40)

**Turtle Beach Internal 2Xwrite 4Xread**  
(TBS 2040R) ..... **\$849.95**

**Sony 4X read/2X write CD-ROM**  
(SON CSP9411S) ..... **\$849.95**

**Micranet 2X Recordable CD-ROM**  
(MNT MCDPLUS) ..... **\$1099.95**

## PNY MEMORY

**PNY**  
"The Memory Leader... Worldwide."

**for PowerBook 5300**

4MB (PNY MM3750LLA4) ..... **\$99.95**  
8MB (PNY MM3750LLA8) ..... **\$249.95**  
16MB (PNY MM3750LLA16) ..... **\$349.95**

**for most Performa, LC, Centris & Quadra Series**

4MB (PNY 4MEG-05) ..... **\$59.95**  
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16MB (PNY 16MEG-01) ..... **\$199.95**  
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**for most Power Macs**

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16MB (PNY 16MEG-05) ..... **\$199.95**  
32MB (PNY 32MEG-05) ..... **\$349.95**

## Video Cards

**Miro MiroMotion DC20**  
• Full-screen and full-motion digital video editing system • Studio quality digitization • Compatible with all video standards • Full S-video with PCI technology • JPEG compression  
**\$749<sup>95</sup>**  
(MRO MRODC20)

**ATI Xclaim GA 4MB True Color Board**  
(ATI 4MBXCLAIM) ..... **\$449.95**

**Matrox 4MB MGA Millennium**  
(MOX 4MBPOWERMIL) ..... **\$399.95**

**Matrox 8MB MGA Millennium**  
(MOX 8MBPOWERMIL) ..... **\$659.95**

## Radius Video Cards

**Radius PrecisionColor 8/1600**  
• Fast, super resolution graphics card gives you productivity gains with business applications at a cost-effective price • 1600 x 1200 @ 8-bits, 832 x 624 @ 24-bits  
**\$549<sup>95</sup>**  
(RAD PRECLR81600)

**Radius Thunder 30/1152**  
(RAD THUND301152) ..... **\$899.95**

**Radius Thunder 30/1600**  
(RAD THUND301600) ..... **\$1299.95**

**Radius Thunder 30/1152 w/Color Eng**  
(RAD COLOR301152) ..... **\$1799.95**

## Scanners

**Visioneer PaperPort VX Mac Scanner & Copier**  
• The easiest way to get paper into your Mac • Easy plug in and go • As little as 2-sec. scans • Superior faxing with SharpPage™ technology • Instant copy machine • Drag & drop filing  
**\$249<sup>95</sup>**  
(VIR PAPERVXMAC)

**Hewlett-Packard ScanJet 4P Color**  
(HP C1139A) ..... **\$499.95**

**Micratek E3 Color Scanner**  
(MTK SCANE3) ..... **\$399.95**

**Hewlett-Packard ScanJet 3C**  
(HP C2529A) ..... **\$899.95**

## Inkjet Printers

**Hewlett-Packard DeskWriter 340CM Printer**  
• Portable • 600 x 300 dpi black, 300 x 300 dpi color resolution • Includes Mac adapter & color kit  
**\$299<sup>95</sup> reg. price**  
**-50<sup>00</sup> mail-in rebate**  
**\$249<sup>95</sup> final price**  
(HP C2663A)

**Hewlett-Packard 660C**  
(HP C2165A) ..... **\$259.95**

**Hewlett-Packard 680C**  
(HP C4550A) ..... **\$299.95**

**Hewlett-Packard 660**  
(HP C2185A) ..... **\$199.95**

## Laser Printers

**Hewlett-Packard LaserJet 5MP**  
• 600 x 600 dpi laser printing • Dual paper trays • Straight-through paper path • 6-ppm • 120 levels of gray • 3MB RAM • Adobe™ PostScript™ Level-2 • Includes AppleTalk®  
**\$999<sup>95</sup>**  
(HP C3155A)

**Hewlett-Packard LaserJet 5N**  
(HP C3952A) ..... **\$1549.95**

**Hewlett-Packard LaserJet 4M Plus**  
(HP C2039A) ..... **\$1599.95**

**Hewlett-Packard LaserJet 5M**  
(HP C3917A) ..... **\$1999.95**

## Monitors

**Panasonic PanaSync™ S17**  
17" Digital Color CRT Display  
• 0.27mm dot pitch • 1,280 x 1,024 maximum resolution NI • MPR-II certified • DQ-QAF electron gun • Power-saving • 3-year parts/labor  
**\$669<sup>95</sup>**  
(PAN S17)

**Portrait Pivot 1700 17" Monitor**  
(PDL M1716-02) ..... **\$999.95**

**Sony GDM-17se-IIT 17" Monitor**  
(SON GDM17SE-IIT) ..... **\$969.95**

**Sony CPD-20sf-II 20" Monitor**  
(SON CPD20SF-II) ..... **\$1649.95**

## Software • Software • Software • Software • Software • Software • Software

**Aztech New Media Mac Cube**  
**MacCube 200** ..... **\$19<sup>95</sup>**

**Apple Internet Connection Kit** ..... **\$44.95**

**Berlitz Think & Talk Spanish** ..... **\$99.95**

**Conflict Catcher (3.1)** ..... **\$64.95**

**Day-Timer Organizer (2.0)** ..... **\$54.95**

**Debabelizer (1.6.5)** ..... **\$259.95**

**Designer (4.1)** ..... **\$89.95**

**Desktop Labels** ..... **\$17.95**

**FileMaker Pro (3.0)** ..... **\$189.95**

**Clarix Works (4.0) with Instant Internet Access** ..... **\$119<sup>95</sup>**

**FileMaker Pro (3.0), version & competitive upgrade** ..... **\$99.00**

**Falderbolt Pra** ..... **\$89.95**

**Incredible 25,000 Image Pak** ..... **\$34.95**

**Japanese Language Kit (1.2)**  
(APP M1648Z/C) ..... **\$139.95**

**Kai's Power Gaa** ..... **\$44.95**

**Kai's Power Tools (3.0)** ..... **\$119.95**

**MacTools Pra (4.0)** ..... **\$89.95**

**Norton Utilities (3.2)** ..... **\$89.95**

**Connectix Speed Doubler (1.1)** ..... **\$54<sup>95</sup>**

**Now Up-to-Date & Contact (3.6)** ..... **\$69.95**

**Office (4.21)** ..... **\$449.95**

**OmniPage Pro (6.0) upgrade** ..... **\$139.95**

**PageMill** ..... **\$99.95**

**PhaneDisc PowerFinder 1996** ..... **\$89.95**

**PowerPaint (4.0)** ..... **\$309.95**

**PowerPrint (3.0)** ..... **\$99.95**

**QuarkXPress (3.32)** ..... **\$679.95**

**Princeton Review Inside The SAT and ACT, 1997** ..... **\$29<sup>95</sup>**

**QuickBaaks (4.0)** ..... **\$119.95**

**QuickBaaks Pra (4.0)** ..... **\$189.95**

**Quicken (6.0)** ..... **\$44.95**

**RAM Daubler** ..... **\$54.95**

**RAM Doubler/Speed Daubler Bundle** ..... **\$79.95**

**Score Builder SAT & PSAT** ..... **\$44.95**

**SoftWindows 95 (3.0)** ..... **\$339.95**

**Streamline (3.1)** ..... **\$129.95**

**Simon & Schuster Typing Tutor (7.0)** ..... **\$29<sup>95</sup>**

**Street Atlas U.S.A. (3.0)** ..... **\$69.95**

**Suitcase (3.0)** ..... **\$69.95**

**Symantec AntiVirus (4.0)** ..... **\$69.95**

**SAM** ..... **\$69.95**

**Type Manager (3.9)** ..... **\$39.95**

**Webster's New World College Dictionary** ..... **\$19.95**

**Word (6.01)** ..... **\$299.95**

**Works (4.0)** ..... **\$44.95**

**WritePra** ..... **\$64.95**

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## NEC Monitors



### NEC MultiSync C500

15" Color Monitor  
•Flat square screen •13.8 viewable image size •0.28mm dot pitch  
•Anti-static coating •1280 x 1024 non-interlaced PC resolution @ 60 to 76Hz, 1024 x 758 Mac res @ 75Hz

**\$369<sup>95</sup>** (NEC C500)

NEC MultiSync C400 14" Monitor (NEC C400) .....\$284.95

NEC XV15+ 15" Digital Monitor (NEC XV15+) .....\$469.95

NEC M500 Multimedia Monitor (NEC M500) .....\$499.95

## Global Village



### Global Village TelePort Platinum™

28.8Kbps Data/Fax Modem  
•S&R data up to 28,800 bps •V.34  
•GlobalFax™, GlobalFax™ OCR & Data communications software •For Macintosh desktops

**\$199<sup>95</sup> reg. price**  
**-30<sup>00</sup> mail-in rebate**

**\$169<sup>95</sup> final price**

(GLV TELEPTPLTN) Offer Ends 8/31/96

TelePort Platinum / Internet (GLV TELINTERNET).....\$199.95, minus \$30 mail-in rebate = **\$169.95**

## Global Village



### Global Village PowerPort Platinum™ PC Card

•28.8 data (v.34), 14.4 fax  
•GlobalFax™, GlobalFax™ OCR & PC Card Enhancement •For Apple PowerBook 190/5000 series

**\$339<sup>95</sup> reg. price**  
**-50<sup>00</sup> mail-in rebate**

**\$289<sup>95</sup> final price**

(GLV PCMCIAPLTNM) Offer Ends 8/31/96

PCMCIA PowerPort Platinum Pro (GLV POWERPLTPRO).....\$499.95, minus \$50 mail-in rebate = **\$449.95**

## Digital Cameras



### Kodak DC20

Digital Science™ Camera  
•Shirt-pocket size •24-bit color  
•1MB storage •Focus-free lens with auto exposure •20-inch to infinity focus distance •Comes with software for Mac and PC

**\$329<sup>95</sup>** (KOD DC20)

Connectix Color QuickCam (CNM CQCM) AFTER \$30 REBATE \$199.95

Kodak Digital Camera 40 (KOD DC40) .....\$599.95

Kodak Digital Camera 50 (KOD DC50) .....\$999.95

## Desktop Modems



### Motorola ModemSurfer

Ext. 28.8K bps Fax/Modem  
•14.4 Fax •Data compression mode •For Macintosh

**\$119<sup>95</sup> reg. price**  
**-20<sup>00</sup> mail-in rebate**  
**\$99<sup>95</sup> final price**

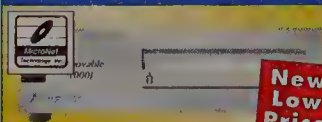
(MOT MAC288SURF)

Zoom V34XMac External Fax/Modem (ZOP V34XMAC) .....\$139.95

Supra Express v.34 Fax/Modem (SRA SO-28XP-MC) .....\$159.95

U.S. Robotics Sportster®/Speakerphone (USR EX288MACVC) .....\$199.95

## MicroNet Drives



### MicroNet Advantage

External 1-Gig Jaz Drive  
•File size will no longer limit you, with the combination of Jaz drive and disks •Faster than most hard drives •1-GIG of disk space on each cartridge •Includes one cartridge

**\$519<sup>95</sup>** (MNT ADV1000JAZE)

Micronet 200MB SyQuest Drive (MNT ADV-SYQ200E) .....\$499.95

Micronet Internal Jaz 1-GIG Drive (MNT AV1000JAZI4) .....\$579.95

2 Micronet 1-GIG Jaz Drives in one cabinet (MNT SS2000JAZA) \$1149.95

## SyQuest Drives



### SyQuest EZ230

230MB External SCSI Drive  
•230MB formatted •13.5msecond average access time •Reads 135 cartridges •Includes 1 235 cartridge

**\$299<sup>95</sup>** (SYQ EZ230EXT)

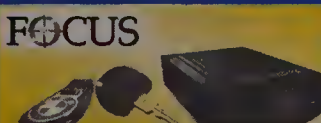
SyQuest® EZ135 Drive (SYQ EZ135EXT) .....\$119.95

SyQuest® 200MB Cartridge Drive (SYQ S914126) .....\$399.95

SyQuest® 270MB Cartridge Drive (SYQ S984126) .....\$399.95

Micronet 200MB SyQuest® Drive (MNT ADV-SYQ200E) .....\$499.95

## FOCUS



### Focus L-TV Micro Macintosh Presenter

•Converts Mac VGA/video signal to standard TV, so you can use TV as presentation device, or record video output from VCR

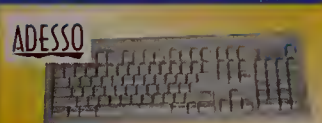
**\$149<sup>95</sup>** (FOC LTVMICROMAC)

Focus LapisColor, video/ethernet exp. card (FOC LCMV8-EN) .....\$149.95

LapisColor MV16, 16-bit video card for S300 only (FOC LCMV16) .....\$159.95

LapisColor MV16-EN, video/ethernet (FOC LCMV16-EN) .....\$179.95

## ADESSO



### Adesso AEK-305

Soft Touch Plus Extended Keyboard  
•105 silent, high quality, full stroke mechanical keyswitches •2 extra ADB ports •Keyboard-length wrist pad •One-year warranty

**\$54<sup>95</sup>** (AEO AEK-305)

Adesso AM-3 PowerMouse (AEO AM-3) .....\$24.95

Adesso Tru-Form Keyboard (AEO AEK-606) .....\$89.95

Adesso Tru-Form Keybd w/Pointer (AEO AEK-806) .....\$99.95

## UMAX Computers



### UMAX S900D

150MHz Mac OS-Compatible MiniTower Computer  
•150MHz 604 Power PC™ CPU  
•16MB RAM •8x-speed CD-ROM  
•6 PCI Slots •3 expansion drive bays •Built-in SCSI-2 and 10Base-T  
•2 Serial and 2 ADB Ports •Includes Extended Keyboard and Mouse  
•Monitor, hard drive and video card not included

**\$3095<sup>95</sup>** (UMX S900D)

UMAX S900L (UMX S900L) .....\$3999.95

## TRUEVISION



### Truevision Bravado 1000

Professional Digital Video Editing Solution  
•Includes the full Adobe Premiere (4.2), \$795 retail value •Full screen video capture at 50/60 fields per second •Variable rate, real time motion JPEG compression  
•24-bit true color capture •Two composite inputs and one S-video input •Two simultaneous video outputs •32-bit PCI local bus with burst DMA •Conversion to popular computer video formats

**\$899<sup>95</sup>** (TRU BRAVA00MAC)

## Removable Media



### 1GIG Jaz Cartridge

1GIG Cartridge  
Iomega (BER MAC1GIGCART) \$124.95 EA  
Micronet (MNT CR1000JAZ) \$124.95 EA

Iomega 100MB Zip Cartridge (BER MAC100MBDSK) .....each \$19.95

(BER MAC100MBTRI) .....3 Pack \$49.95

(BER MAC100MBTEN) 10 Pack \$149.95

SyQuest® Cartridges

44MB (SYQ SQ400) .....\$39.95

88MB (SYQ SQ800) .....\$39.95

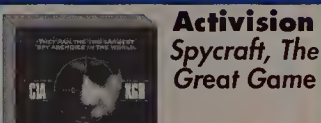
105MB (SYQ SQ105) .....\$49.95

135MB (SYQ SQ135) .....\$19.95

230MB (SYQ SQ230) .....\$29.95

200MB (SYQ SQ2000) .....\$59.95

## Software • Software • Software • Software • Software • Software • Software • Software



### Activision Spycraft, The Great Game

**\$44<sup>95</sup>**

AfterLife .....\$46.95

Arcade America .....\$34.95

Bad Majo: The Roach Game .....\$46.95

Colonization .....\$42.95

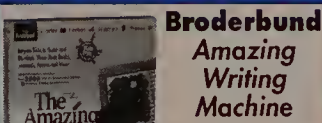
Critical Mass .....\$34.95

Dark Farces .....\$46.95

Descent .....\$29.95

Elk Moon Murder .....\$24.95

Isis .....\$29.95



### Broderbund Amazing Writing Machine

**\$34<sup>95</sup>**

JumpStart 1st Grade .....\$34.95

JumpStart Preschool .....\$34.95

Kid Pix Studio .....\$34.95

Kingdom, The Far Reaches .....\$29.95

Learning Adventure Library 1 .....\$69.95

Learning Lodder: Phanics Adventure .....\$29.95

Learning Ladder: Reading Adventure .....\$29.95



### Electronic Arts Top Ten Pak II

**\$29<sup>95</sup>**

Logicol Journey of the Zoambinis .....\$34.95

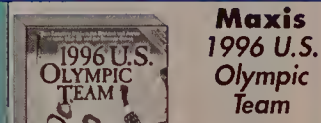
Moc Golf Pack .....\$24.95

Madeline Thinking Games .....\$29.95

MathBlaster Plus: Search Far Spot .....\$34.95

Monty Python's Complete Waste Of Time .....\$36.95

Martimer & The Riddles of Medallion .....\$34.95



### Maxis 1996 U.S. Olympic Team

**\$24<sup>95</sup>**

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Nine Worlds .....\$29.95

Oregon Trail II .....\$49.95

Origins Of Mankind .....\$29.95

Paul Cezanne- Partrait Of My World .....\$34.95

Paws .....\$19.95

Where In The World Is Carmen Sandiega?.....\$39.95

Wing Commander IV .....\$44.95

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market for 10 years...

## MACINTOSH MEMORY UPGRADES

Now we bring our expertise  
to the Apple Macintosh user.

YOUR MACHINE	STANDARD	MAX	VIDEO UPGRADE	VIDEO COST	256K CACHE	2MB	4MB	6MB	8MB	10MB	12MB	16MB	32MB	64MB
Apple PowerBook 190, 190CS, 5300	4	32					69		148		215	270	474	48mg=511
Apple PowerBook 520, 520c, 540, 540c Notebook	4	36					84		117		185		326	
Apple PowerBook DUQ 210, 230, 250 Notebook	4	24					85		138		173		20mg=256	
Apple PowerBook DUQ 270c Notebook	4	32					85		138		173		20mg=256	36mg=726
Apple PowerBook DUQ 280, 280c Notebook	4	40					85		138		173		20mg=256	
Apple PowerBook DUQ 2300c/100 Notebook	4	40					85		128			185	405	48mg=530
Apple Macintosh TV	5	8					74							
Apple Macintosh IIfx	4	128					119					199		949
Apple Macintosh IISI	2/3/5	17					79		189			219		
Apple Macintosh IIfx & IISI	4	68	512k	59			79		189			219		949
Apple Macintosh Classic							153							
Apple Macintosh Color Classic	4	10	256k	34		54	79		124					
Apple Macintosh Classic II, LC, LCII	2/4	10	512k	59		54	79		124					
Apple Macintosh LCIII, LC475, LC550, LC575	4	36	256k	34			39		69			129	259	
Apple Macintosh LC520	5	36					39		69			129	259	
Apple Macintosh LC580	5	36					39		69			129	259	
Apple Macintosh LC429	4	36					39		69			129	259	
Apple Macintosh LC5200	5	36					39		69			129	259	
Apple Macintosh IIfx	1	128					79		124			356		949
Apple Macintosh II, IIfx	1	32					79		124			356		
Apple Macintosh Plus, SE	1	4				61	79							
Apple Macintosh SE30	1/2	32				61	79		124				259	
Apple Performa 200	2	10				61	79		124					
Apple Performa 400	4	10				61	79		124					
Apple Performa 405, 410, 430	4	10				61	79		124					
Apple Performa 450, 460, 466, 467, 475, 476	4	36	256k/512k	34/68			39		69			129	259	
Apple Performa 550, 575, 577	5	36					39		69			129	259	
Apple Performa 600, 600CD	4	68	512k	59			79		189			356		949
Apple Performa 6110CD, 6112CD, 6115CD (pairs)	8/16	72					39		69			129	259	
Apple Performa 6117CD, 6118CD (pairs)	8/16	72					39		69			129	259	
Apple Performa 429	4	36					39		69			129	259	
Apple Centris 610	4	68	512k	59			39		69			129	259	
Apple Centris 650	4	132	512k	59			39		69			129	259	
Apple Centris 660AV	4	68					39		69			129	259	
Apple Quadra 605	4	36	512k	59			39		69			129	259	
Apple Quadra 610	4	68					39		69			129	259	
Apple Quadra 429	4	36					39		69			129	259	
Apple Quadra 650	4/8	132/136					39		69			129	259	
Apple Quadra 660AV	4	68					39		69			129	259	
Apple Quadra 700	4	68	512k	59			79					356		949
Apple Quadra 800 (pairs)	8	136	512k	59			39		69			129	259	
Apple Quadra 840AV	8	128	512k	59			39		69			129	259	
Apple Quadra 900	4	256	512k	59			79					356		949
Apple Quadra 950	8	256	512k	59			79					356		949
Apple Workgroup Server 60 (pairs)	4	68					39		69			129	259	
Apple Workgroup Server 80 (pairs)	8	136					39		69			129	259	
Apple Workgroup Server 95	16/32/48	256					79					356		949
Apple Workgroup Server 6150 (pairs)	8	72					39		69			129	259	
Apple Workgroup Server 8150 (pairs)	16	264					39		69			129	259	
Apple Workgroup Server 9150 (pairs)	16/24	264					39		69			129	259	
Apple Power Macintosh 6100/60 (pairs)	8	72	512k	59			39		69			129	259	
Apple Power Macintosh 7100/66 (pairs)	8	136	512k	59			39		69			129	259	
Apple Power Macintosh 7200 (168 pin)	8	136	1mg	69	99		69		89			164	339	679
Apple Power Macintosh 7500/100 (168 pin)	8	136	1mg	69	99		69		89			164	339	679
Apple Power Macintosh 8100/80 (pairs)	8	264	512k	59			39		69			129	259	839
Apple Power Macintosh 6100/66 & 6100/66AV (pairs)	8/16	72					39		69			129	259	
Apple Power Macintosh 7100/66AV (pairs)	16	136					39		69			129	259	
Apple Power Macintosh 7100/80, 7100/80AV (pairs)	8/16	136					39		69			129	259	
Apple Power Macintosh 8100/100, 8100/100AV (pairs)	8/16	264					39		69			129	259	
Apple Power Macintosh 8100/110 (pairs)	8/16	264	512k	59			39		69			129	259	
Apple Power Macintosh 8500/120	8/16	264			69		69		89			164	339	679
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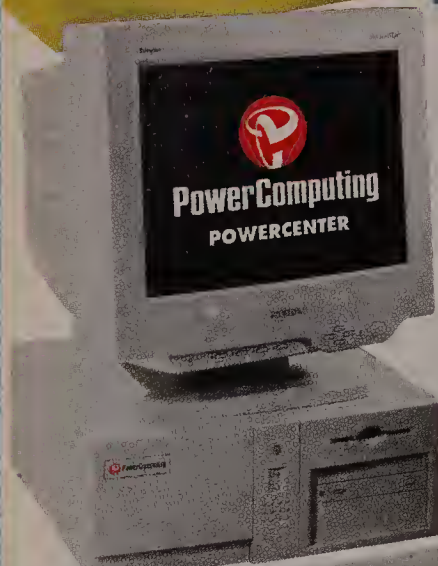
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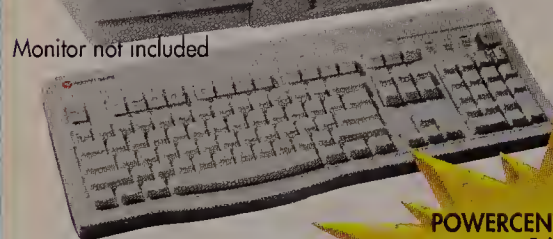


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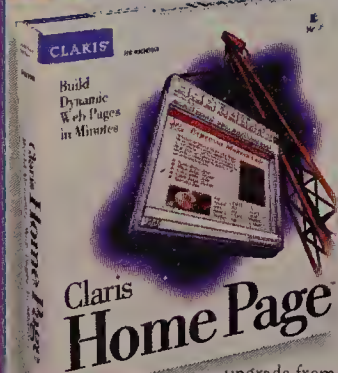
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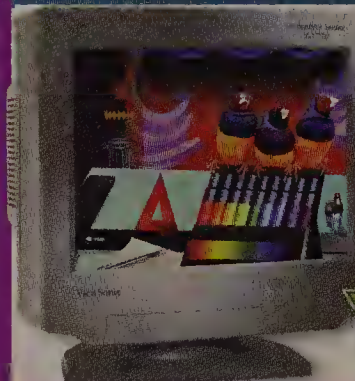
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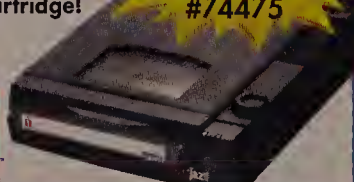
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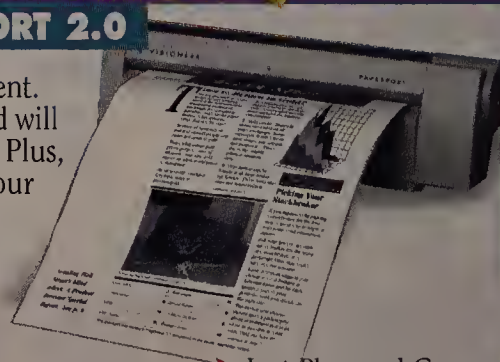
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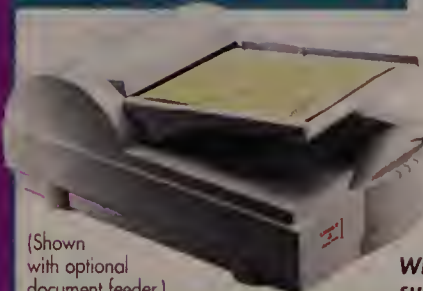
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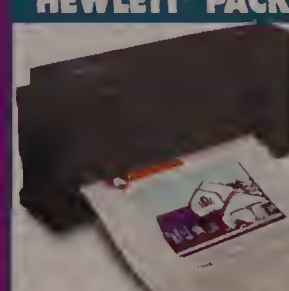


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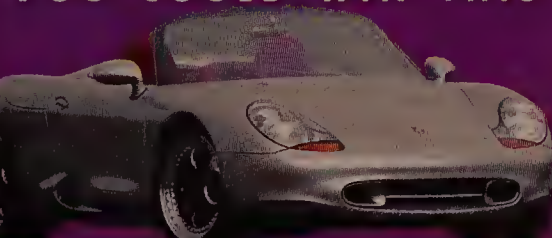
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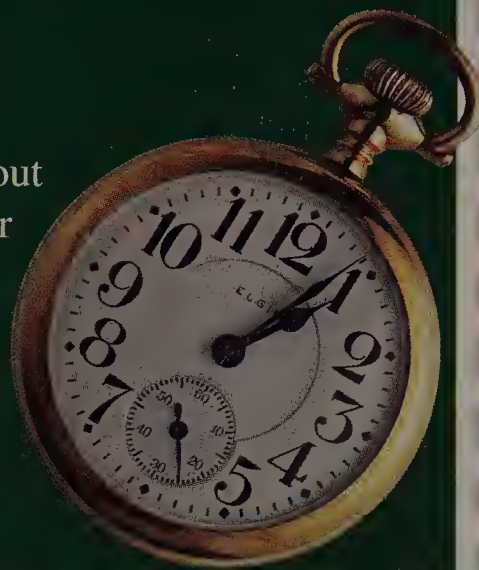


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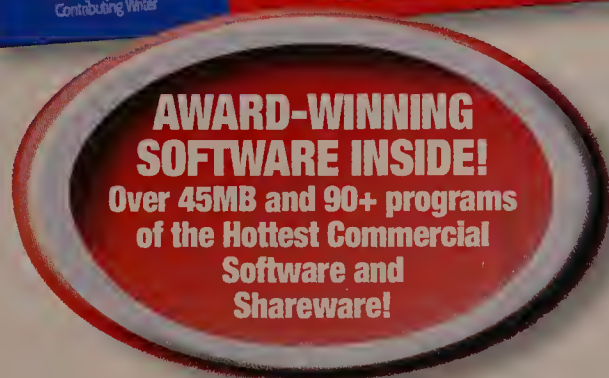
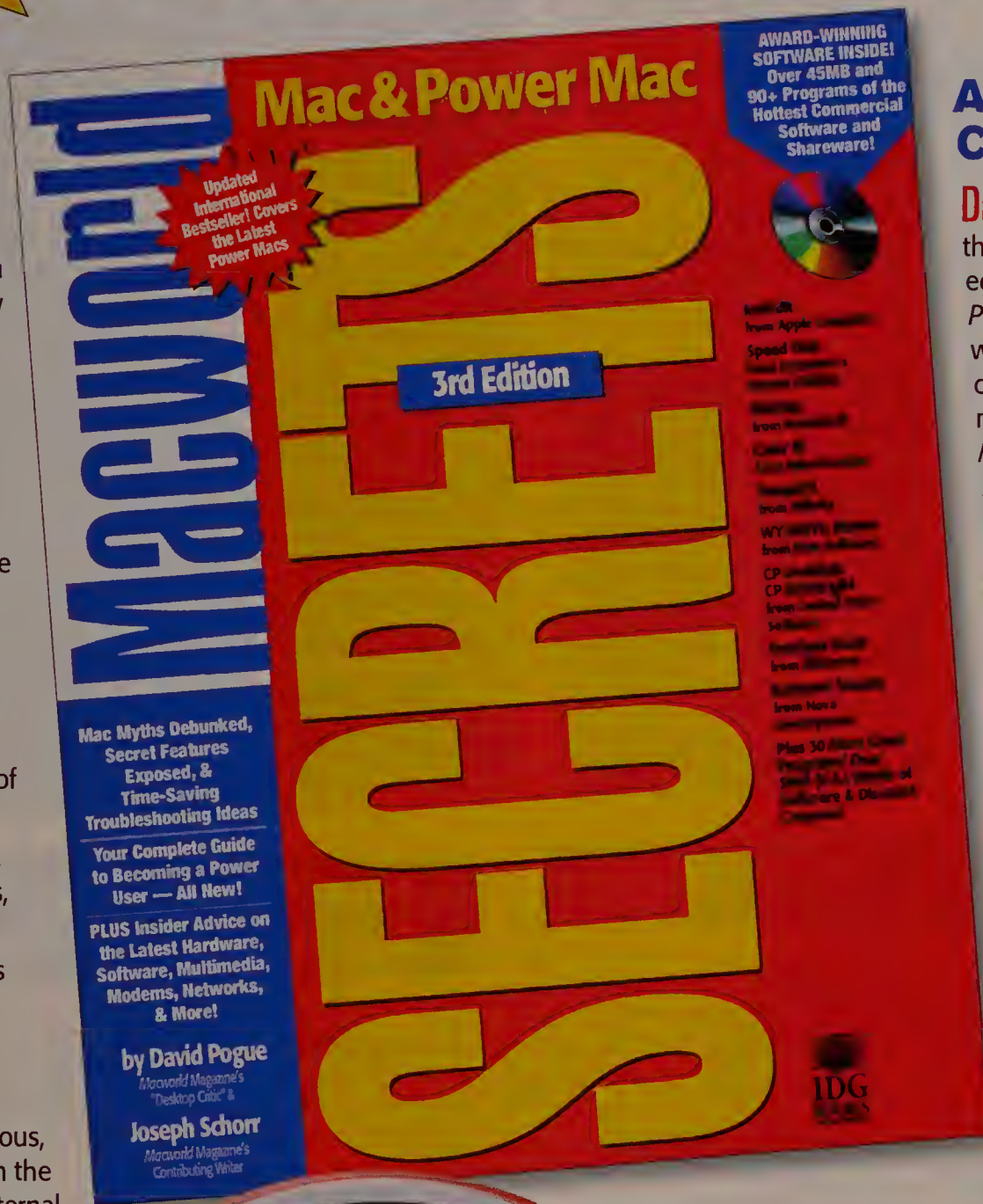
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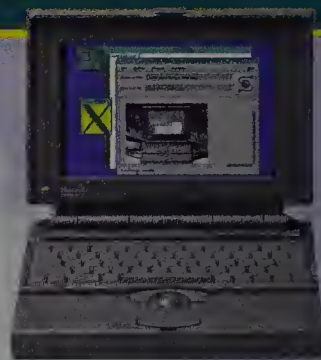
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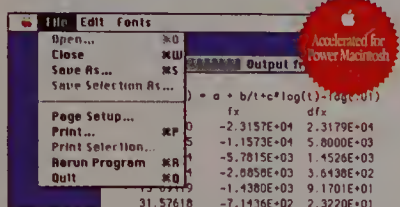
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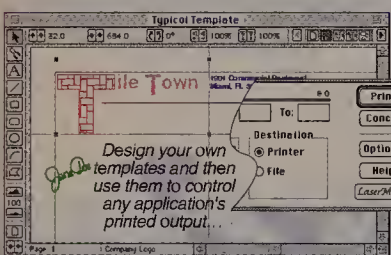
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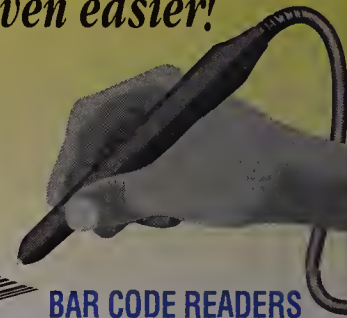
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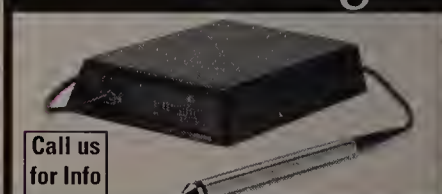
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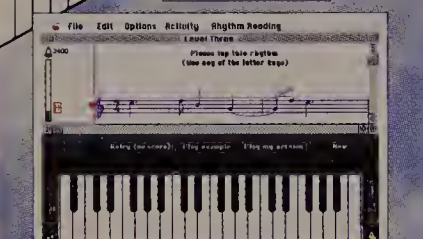
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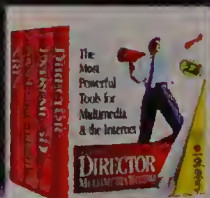
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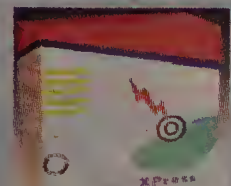
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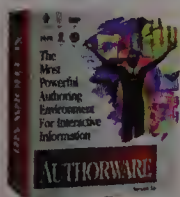
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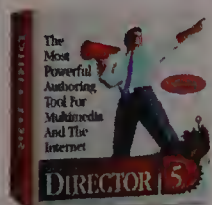
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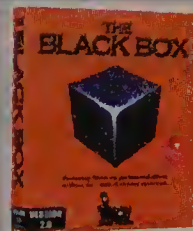


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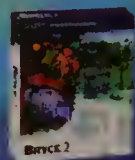
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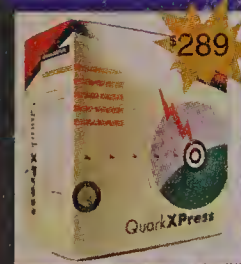
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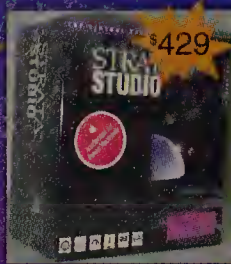


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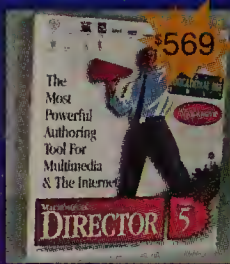




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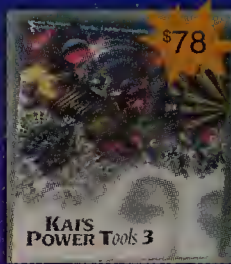
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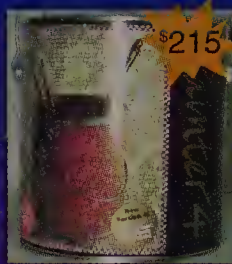
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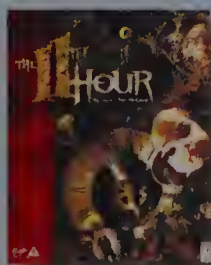
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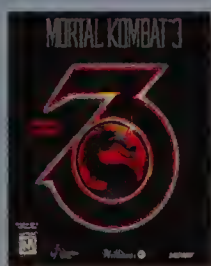
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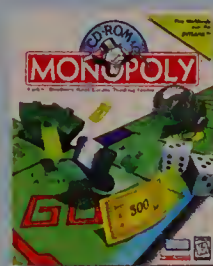
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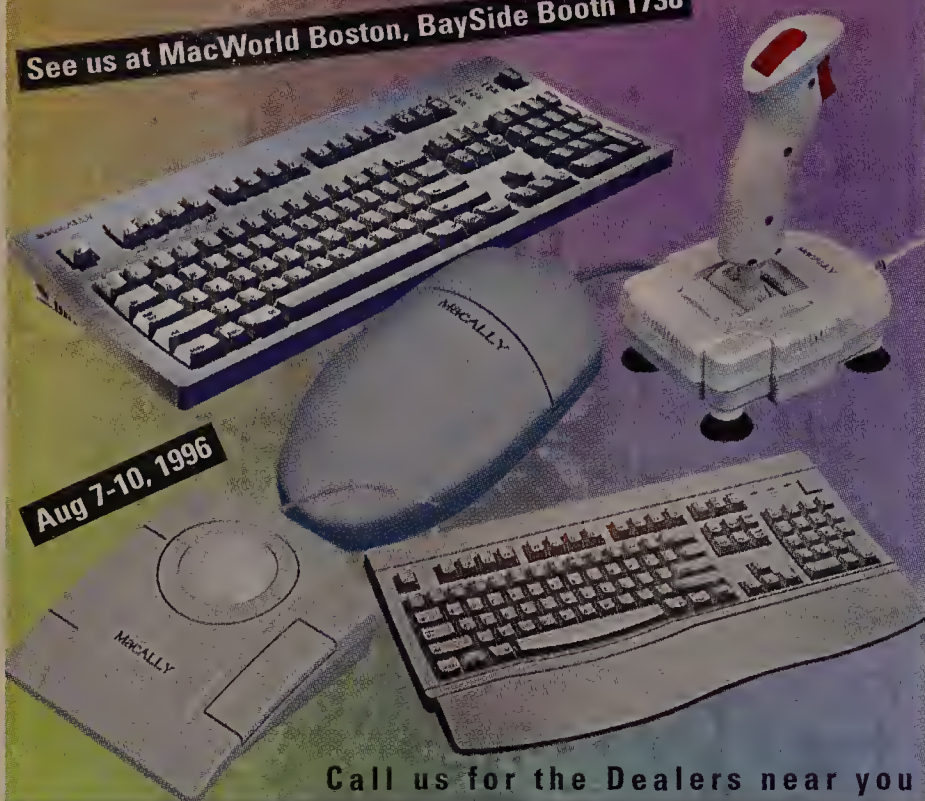
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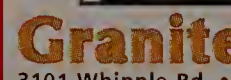
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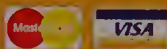
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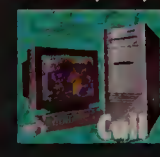
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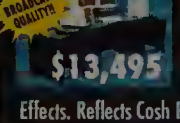


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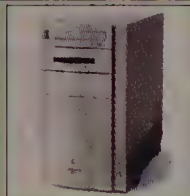
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*Apple 14" MultiScan	\$275. <sup>00</sup>
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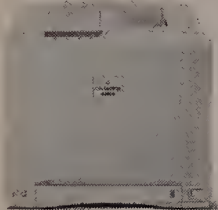
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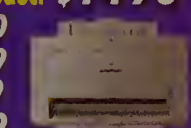
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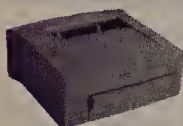


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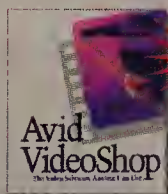
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# Specials



# Specials

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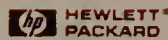
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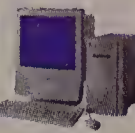
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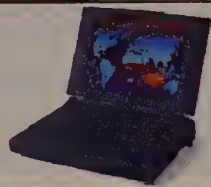
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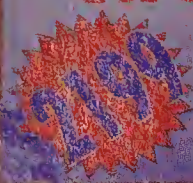
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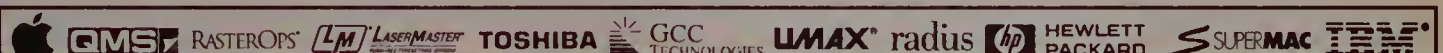
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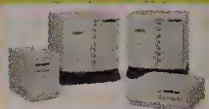
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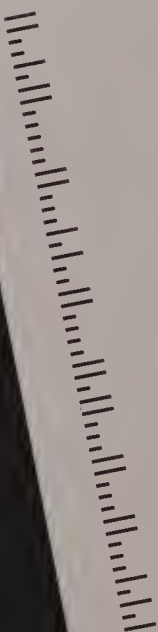
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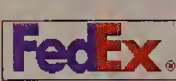


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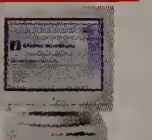
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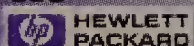
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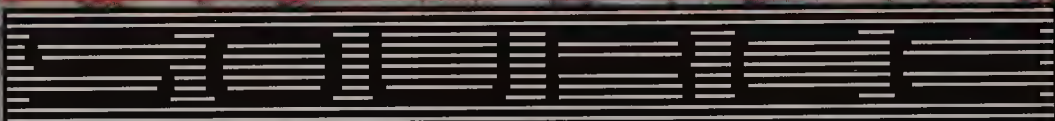
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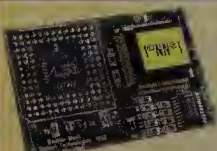
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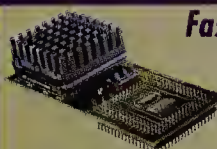
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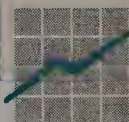
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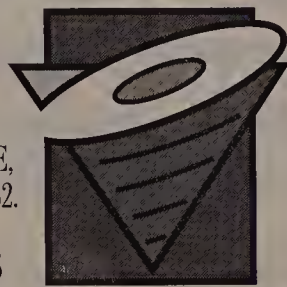
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Brochure	2	14	Package Design
Catalog	3	15	Photograph
Covers (CD, Book)	4	16	Poster
Direct Mail	5	17	Point-of-Purchase
Illustration	6	18	Print Ad
Invitation	7	19	Self-Promotion
Logo or Trademark	8	20	Student (see contest rules)
Letterhead and Envelope	9	21	Wearables (tee-shirts, hats)
Magazine: cover/spread	10	22	Web Sites
Miscellaneous	11	23	Special Effects or 3-D
Multimedia	12	24	Before & After (Send sample of each, identify "AFTER" entry)
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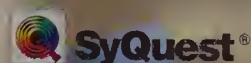
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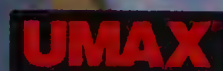
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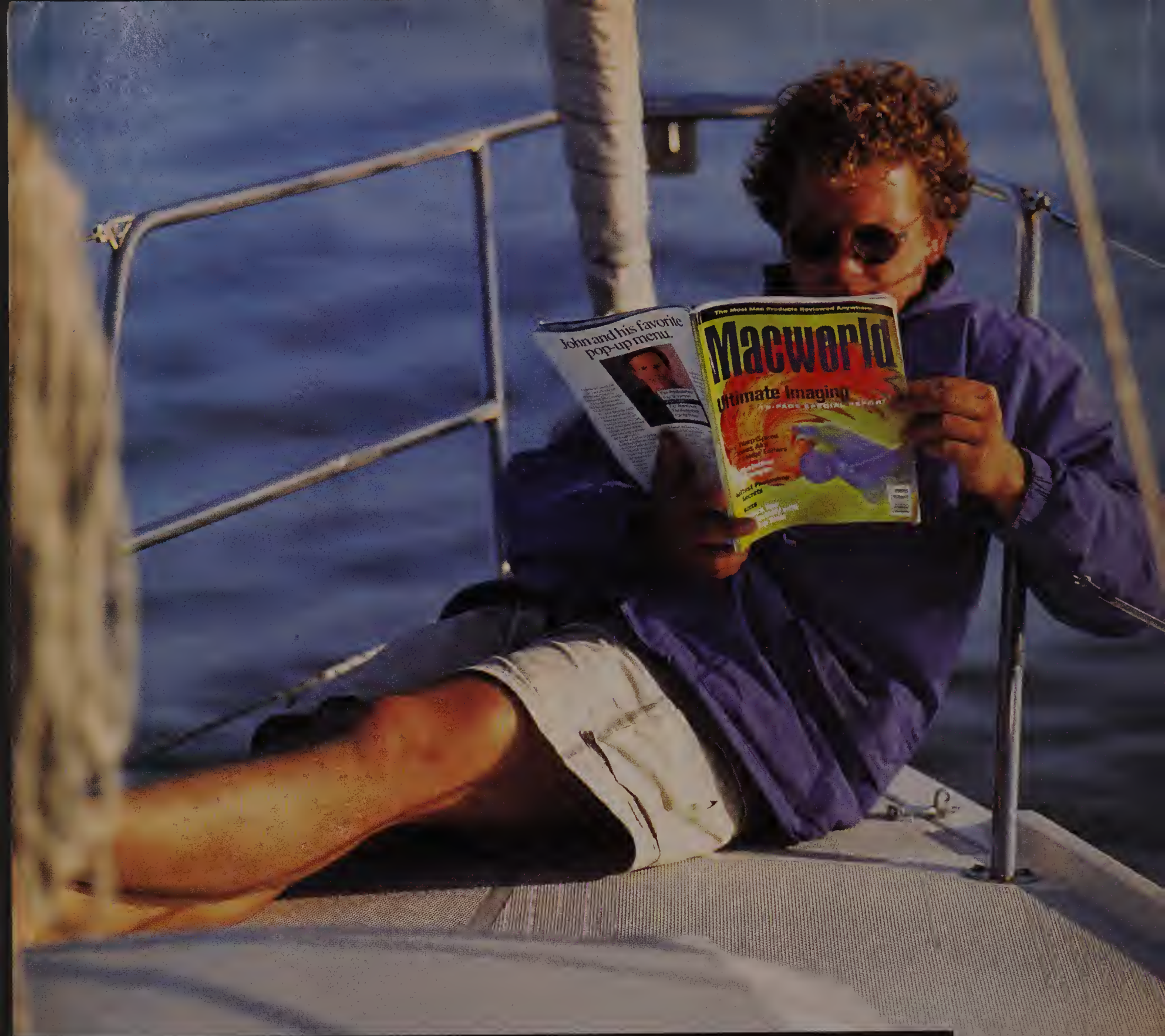
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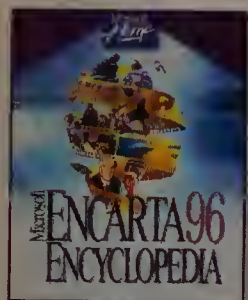


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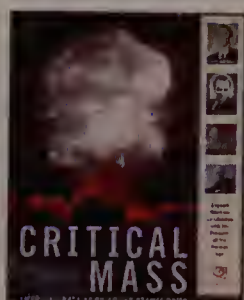
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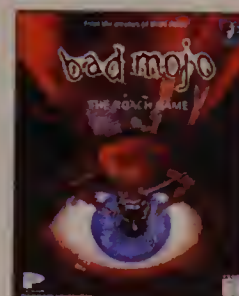
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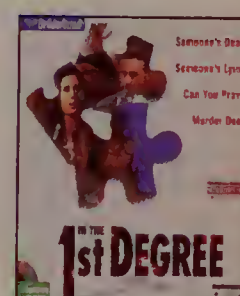
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## Evolution, Revolution, or Reformation?

HOW WILL TOMORROW'S HISTORIANS MEASURE THE INTERNET PHENOMENON?

ONE OF THE PERKS OF working in a museum is the people you run into. Recently a German historian of technology stopped in to the editorial office of the journal I work for. It's a scholarly journal, and there are plenty of scholars around who think that, what with the ability to self-publish on the World Wide Web, such journals are headed the way of the dodo—and good riddance. So the conversation inevitably turned to electronic publishing, the future of scholarly publishing, and so on. The German scholar observed, “You know, here you tend to view these things as either the salvation of the world or utter damnation. In Europe it's not like that, maybe because we've seen more revolutions. We know it's just a computer.”

Have we really gone overboard over the Internet? Even people who want to tone down the frenzy seem to get swept up. This past May, Steven McGeady, vice president of Internet technologies for Intel, told a Harvard conference audience that the cockeyed predictions of Internet futurists were feeding an unwarranted hysteria. He prefers, he said, “to look as carefully as [he] can at the past for a vision of the future”—presumably a more sober one.

Where does McGeady find clues to understanding these interesting times? Try the Protestant Reformation, that minor episode in European history that arose out of a small disagreement over the nature of eternal salvation and went on to shake the cultural foundations of Western civilization, redraw the political map of Europe, and light the fuse on the Industrial Revolution. Nothing to get worked up about.

### Revolutions Compared

Another comparison equates “this” Information Revolution, electronic publishing, with “that” information revolution, Gutenberg's invention of the movable-type print-

ing press 500-plus years ago. With that invention, printed texts went from being a rarity, laboriously hand-copied one at a time, to a mass-produced, commonplace commodity. The technology did more than simply spread the printed word. Among other things, it spread literacy, enabling large numbers of people to do something as radical as read the Bible for themselves.

While some thinkers welcome the Internet for its democratizing potential, others are skeptical or even gloomy. Sven Birkerts, for example, in *The Gutenberg Elegies: The Fate of Reading in an Electronic Age* (Faber & Faber, 1994), fears that we face the end of literature rather than the liberation of information.



Either way, we still use the same language—“publishing” online things called “electronic books,” for example—to talk about both print and electronic paradigms, even as the two forms grow more dissimilar. The confluence of factors that made adoption of the printing press feasible—from the spread of literacy to the development of the textile industry (rags for paper)—doesn't much resemble the network of systems, technologies, habits, and desires that produced the World Wide Web, but the comparison is still suggestive. McGeady's point is that translating the Bible and other religious texts into the vernacular provided *content* that

made the ability to print books useful and desirable. And content, as plenty of people are anxious to point out, is something the World Wide Web still needs. Right now, there's not much there there.

While it's natural to compare the two information revolutions, it does tend to push us toward the millennialist view—which, as my German colleague pointed out, Americans seem drawn to anyway. Print so effectively wiped out oral culture that it's nearly impossible for us to imagine that preliterate culture; we can't unlearn how to read. Will new media—not just the hypertext world of the Web, but electronic communications media of all sorts—do to print culture what print did to oral culture? Will society become postliterate, and if so, what will that mean?

### Closer to Home

These are important questions, but still visionary. Meanwhile, we're left looking for some workaday perspective. Fortunately, poking around in the historical attic is a bit like consulting that vernacular Bible to support an argument; you can find something to suit nearly any purpose. (By the by, the Bible is now available online in multiple translations with full automated searching; cross-references to important works of literature published since 1517; and links to concordances, commentaries, QuickTime movies of places mentioned in the text, and audio clips of Charlton Heston reading from the Book of Exodus.) Whoever coined the term *information superhighway* already said a lot about the striking parallels between networked computers and what's still the emblematic technology of the twentieth century, the automobile. Next time you're stuck in freeway traffic or bogged down online waiting for a page to download, you'll have time to think of other analogies. **m**

JOE SCHULTZ is managing editor of *Technology and Culture* (<http://bfm.umd.umich.edu/tc>), the journal of the Society for the History of Technology.





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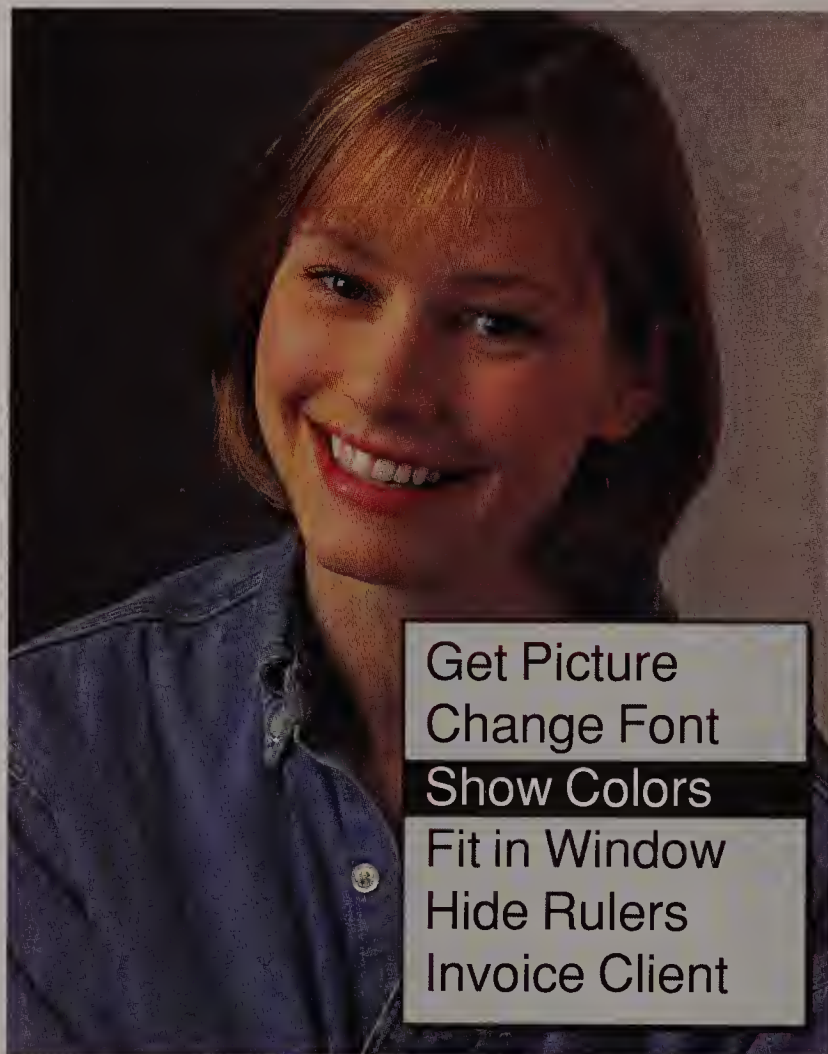
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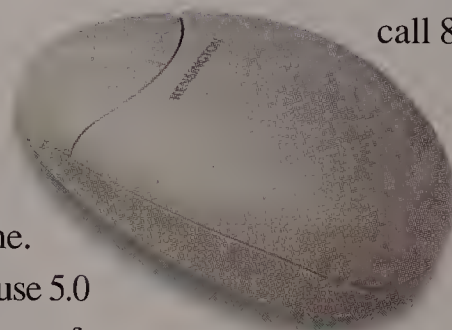
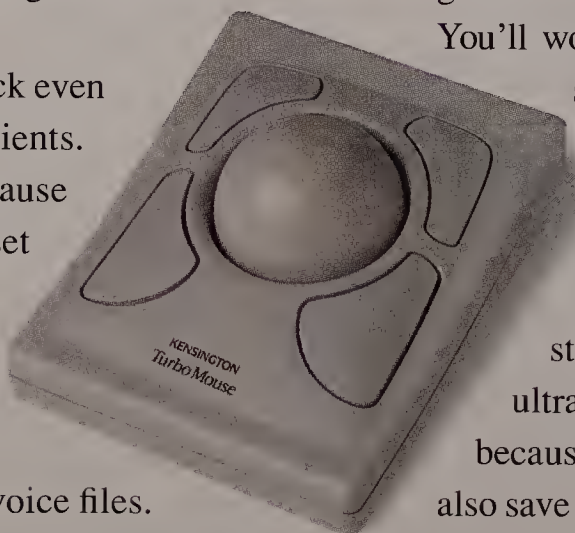
Turbo Mouse 5.0 features a new four-button design, a large, comfortable ball, and stainless steel bearings for ultrasmooth movement. And because it's a trackball, you also save desk space. Kensington Mouse, our new two-button conventional mouse, features a tapered

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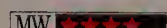
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Turbo Mouse 5.0  
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